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RUN

THE COMMODORE 64/128 USER'S GUIDE

November 1988
An IDGC/I Publication

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See page 36

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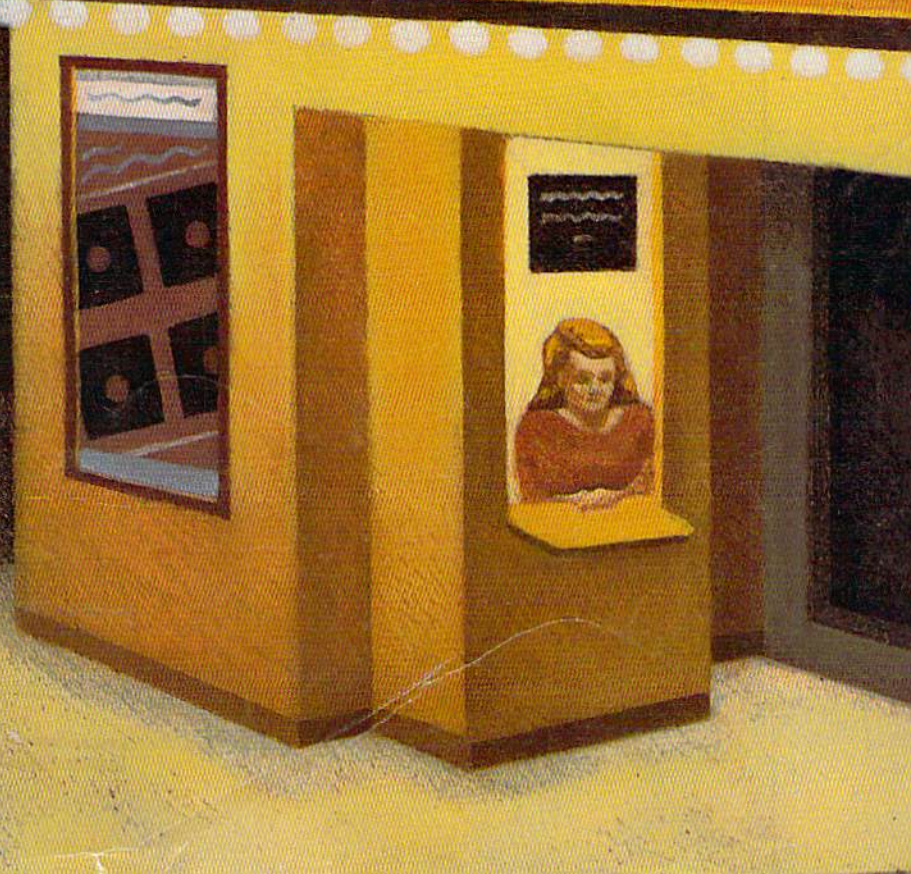

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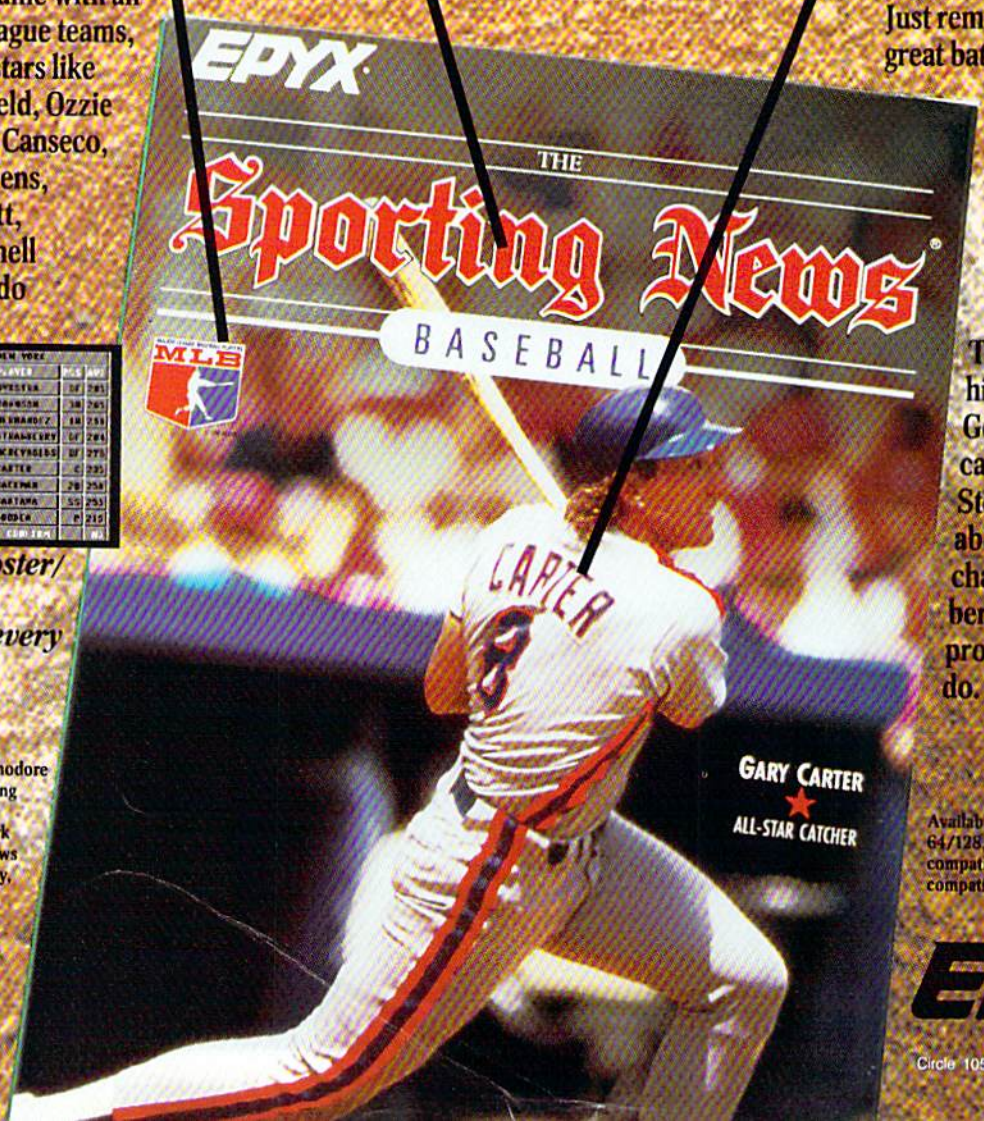

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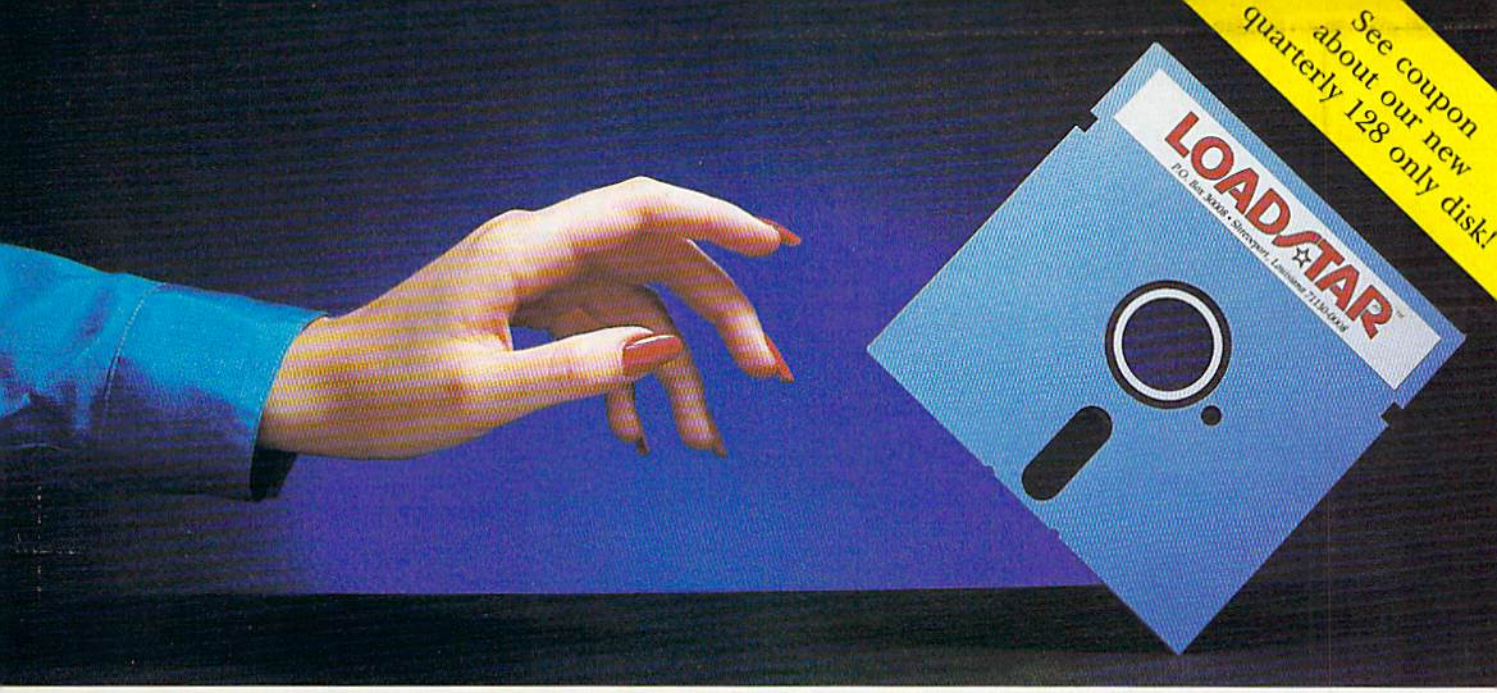

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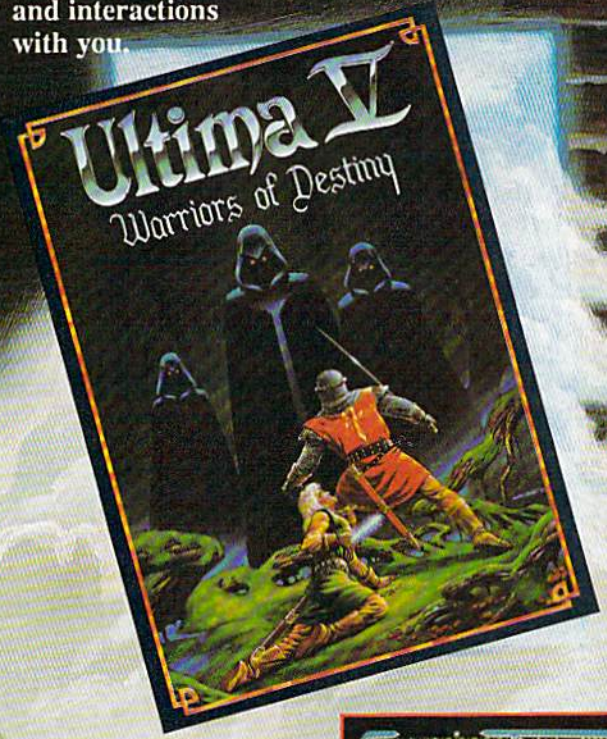

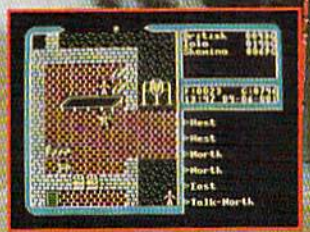

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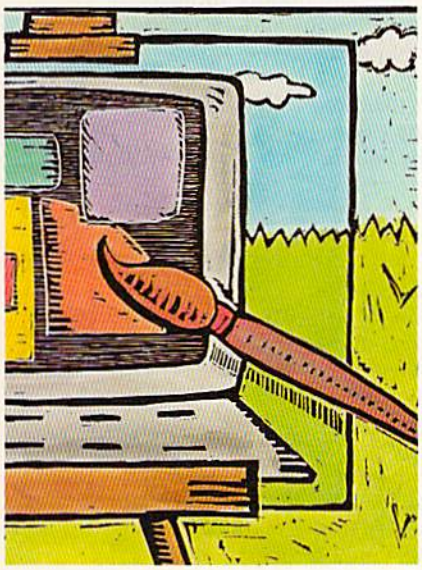

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* The listings for these articles are also available on the November–December 1988 ReRUN disk. To order, see the bind-in card at page 16.

PUBLISHER
STEPHEN ROBBINS

EDITOR-IN-CHIEF
DENNIS BRISSON

MANAGING EDITOR
SWAIN PRATT

SENIOR EDITOR
BETH S. JALA

ASSOCIATE EDITOR
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COPY EDITOR
PEG LEPAGE

CONTRIBUTING EDITORS
ROBERT KODADEK; ROBERT ROCKEFELLER; JOHN RYAN

ART DIRECTOR
HOWARD G. HAPP

DESIGNERS
ANNE DILLON
LAURA JOHNSON

PRODUCTION
ALANA KORDA

NATIONAL ADVERTISING SALES MANAGER
KENNETH BLAKEMAN

SALES REPRESENTATIVES
NANCY POTTER-THOMPSON
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CLASS AD SALES
HEATHER PAQUETTE
603-924-9471

ADVERTISING COORDINATOR
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WEST COAST OFFICE:

WESTERN STATES SALES MANAGER
GIORGIO SALUTI

3350 W. BAYSHORE ROAD, SUITE 201
PALO ALTO, CA 94303
415-328-3470

CIRCULATION DIRECTOR
PAUL RUESS
1-800-525-0643

ASSISTANT CIRCULATION MANAGER
PAM WILDER

MARKETING MANAGER
WENDIE HAINES-MARRO

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LAURA LIVINGSTON

EXECUTIVE ASSISTANT TO PUBLISHER
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RUNning Ruminations

A Christmas Message

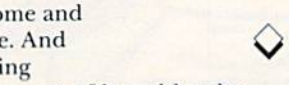
Oh-oh. The rumors are starting already. I can hear the murmurs growing stronger in the background: "This will be the last big Christmas for Commodore."

Every pre-holiday season since 1985, as sure as death, taxes and software piracy, the doomsayers peer into their clouded crystal spheres to forecast dismal prospects for the Commodore industry. Yet, each year, shoppers defy these dire predictions and, in record numbers, choose Commodore as their computer purchase. This year should be no exception.

Other computer manufacturers would love to sell a million of their units per year. Only Commodore does—despite the absence of ads and aggressive marketing.

Incredulously, industry analysts are at a loss to explain the longevity and popularity of the Commodore computers. It's no fluke.

And now, back for yet another rendition of its swan song, the Commodore 64!



Like the mythical Phoenix rising from its ashes, the Commodore 64 thrives despite rumors of its demise. It offers first-time computer buyers an excellent value. Users soon learn that the machine has practical applications—in school, at home and at work—besides great entertainment value. And once users invest time and money in learning the system, there develops a significant amount of brand loyalty.

This year marks the seventh Christmas for the C-64, so there's no telling how much longer it will enjoy success in the market. I only know that, like thousands of fellow C-64 users, I anticipate many more hours of productivity and entertainment from my system.

There's lots of interesting software being developed for it that I have yet to try. And I look forward to new technologies on the horizon. Commodore 64 owners can continue to look to *RUN* for new and interesting C-64 material that we will be publishing—both on disk and in the magazine.

Commodore president Max Toy recently told us that sales of Commodore eight-bit computers are ahead of last year, when over a million were reported sold.

All of this is not startling news to us, nor should it be to you if you've been following the Commodore market for any number of years. Sure, I'm aware that Commodore users are upgrading to Amigas and MS-DOS machines. But there remains a core of dedicated Commodore eight-bit users. Add to that a steady influx of new owners who are embracing the Commodore home computers and you have a vibrant marketplace with active users.

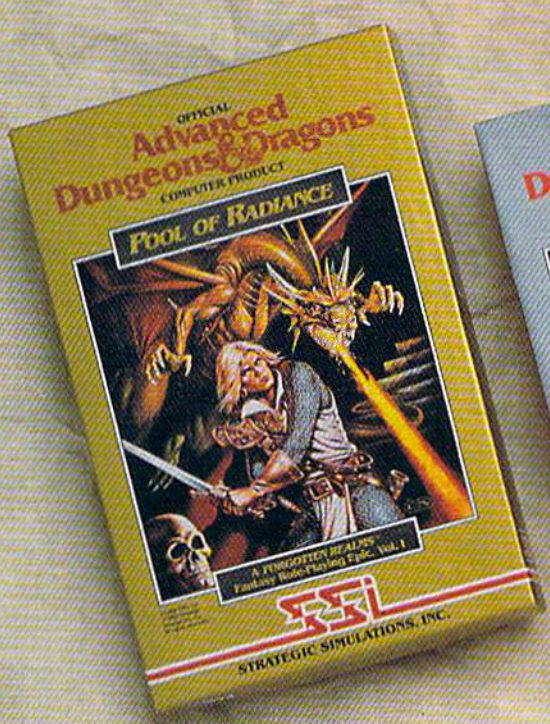
So I refuse to listen to Commodore-bashers who try to convince me that the machine is dead and that I would be better off multitasking on a different computer system, or computing at a faster speed, or learning the intricacies of MS-DOS.

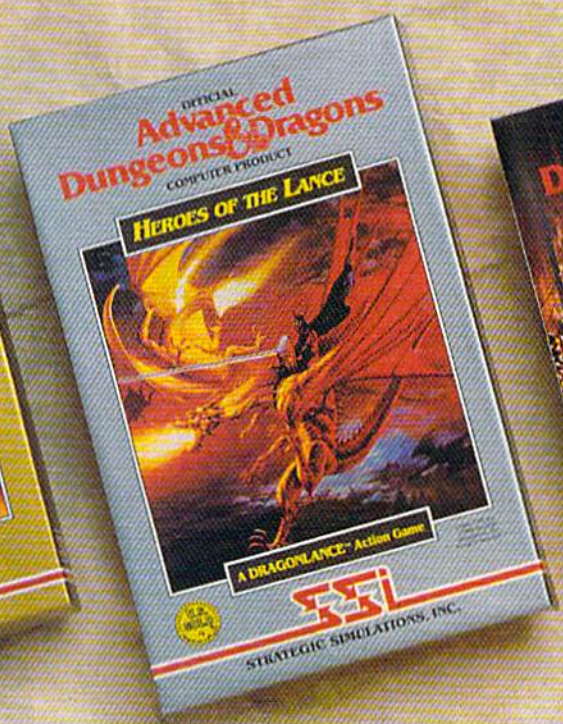
I also don't want to hear that Christmas is coming with predictions of impending doom for Commodore. Like Ebenezer, I don't believe in that particular Christmas message. Bah! Humbug!

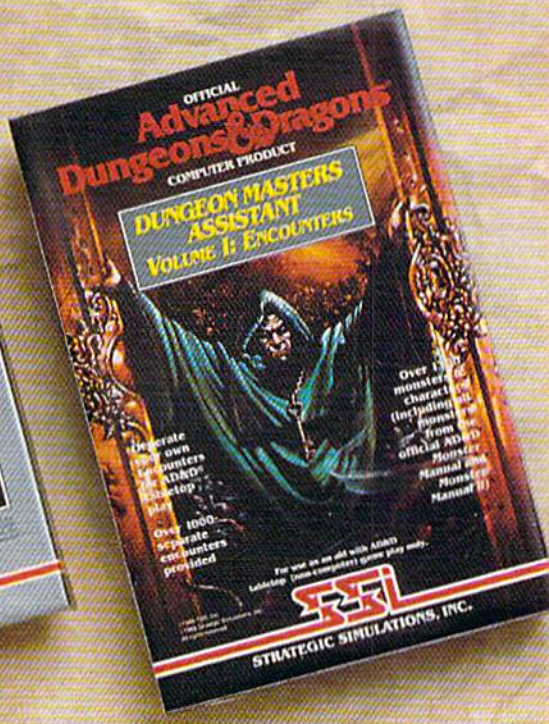
Dennis Brisson
Editor-in-Chief

Advanced Dungeons & Dragons®

COMPUTER PRODUCTS







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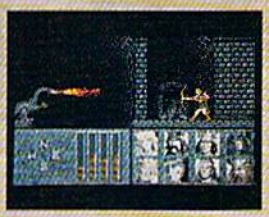

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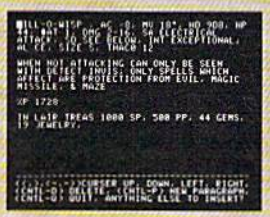
Utility

DUNGEON MASTERS ASSISTANT, VOLUME I: ENCOUNTERS is a utility program designed to help Dungeon Masters generate encounters for AD&D® campaigns. It provides more than 1000 encounters, and over 1300 monsters and characters, including all of the monsters found in AD&D® *Monster Manuals I & II*. DMs can modify the existing data and add original monsters and encounters to the database.



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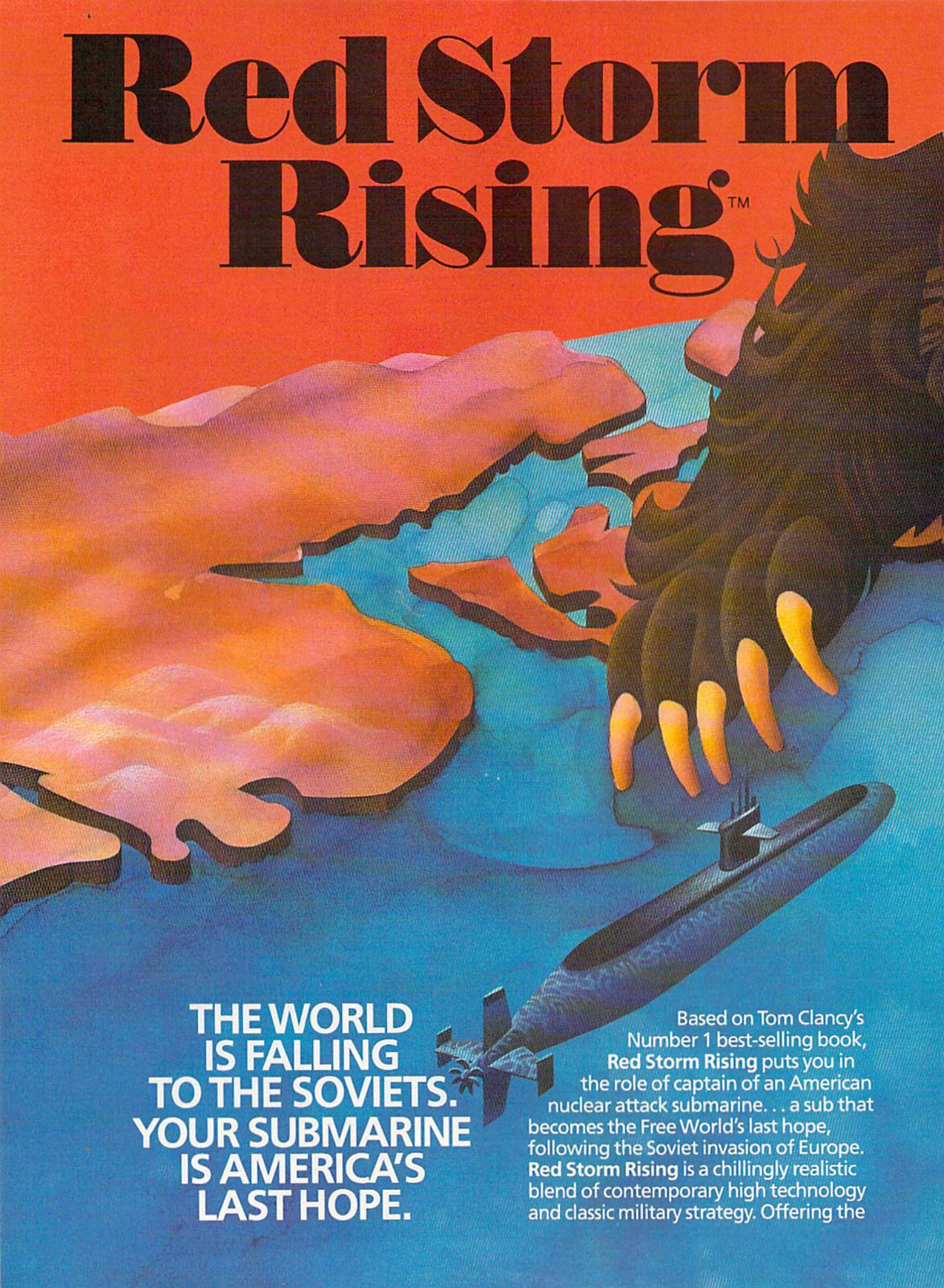
Red Storm Rising™



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MAGIC

Get greater control over your C-64 with four new functions; enter an exciting motocross race.

Compiled by TIM WALSH

$4E2 Simple File Protection

Here's a way to save programs to disk in a manner that prevents unauthorized access. Save the program as follows:

SAVE"FILENAME,S",8

The program will appear on the directory as a sequential file if a ,S is added to the filename. Loading this bogus sequential file is a matter of simply entering:

LOAD"FILENAME,S",8

This process also creates a bogus user file if a ,U is used instead.

—John H. Schick, Norwalk, OH

$4E3 C-64 Motocross

Racing a motocross motorcycle requires courage, skill and quick reactions. While courage is not necessary for playing C-64 Motocross, the skill and quick reactions are. By pressing the C (left) and M (right) keys, you are scored on your ability to guide a motorcycle between markers on a narrow, unpredictable, computer-generated race course.

Motocrossers, start your computers!

```
Ø REM C-64 MOTOCROSS - JOSEPH R. CHARNETSK
  I                                   :REM*114
1Ø V=53248:M=54296:W=V+31:LM=22Ø:LL=132:MC
  =2Ø3:T=8:L=2Ø:R=36:C=16:Z=22:P$="{HOME}
  {2 CRSR DNs}"                       :REM*94
2Ø FORJ=832TO894:READD:POKEJ,D:NEXT:POKEW+
  1,Ø:POKEW+2,Ø:POKE2Ø4Ø,13:POKEV+1,145
                                      :REM*145
3Ø PRINT"{SHFT CLR}{CTRL 8}{CTRL 9}MOTOCRO
  SS":POKEW+T,RND(Ø)*6+1:POKE646,PEEK(W+T
  )+3:S=-9:X=172                      :REM*137
4Ø POKEV,X:POKEV+21,1:F=PEEK(W)       :REM*23Ø
5Ø PRINTP$SPC(39)CHR$(148)" "SPC(C)"{SHFT
  W}{6 SPACEs}{SHFT W}":POKELM,LL:S=S+1:I
  FS<.GOTO5Ø                          :REM*48
6Ø PRINTP$S:G=PEEK(MC):POKEM,T        :REM*27
7Ø X=X+T*((G=L)-(G=R)):POKEV,X:IFC<T OR C=
  INT(RND(.)*T+C)THEN N=1-N           :REM*69
8Ø C=C-(N=.)+(N=1):IF C>Z THEN C=Z:N=1
                                      :REM*224
9Ø POKEM,.:ON-(PEEK(W)=.)GOTO5Ø:FORE=1 TO
  1Ø:POKEV+39,E:GETB$:NEXT:POKEV+21,Ø
                                      :REM*99
1ØØ PRINTCHR$(147)"{CTRL 8}YOU CRASHED!"P$
    "SCORE= "S:INPUT"{CRSR DN}TRY AGAIN (Y
    /N)";A$                           :REM*47
11Ø IF A$="Y" THEN RUN                :REM*125 ►
```

Trick of the Month

$4E4 C-64 RUN Control

64 RUN Control is probably the shortest but most useful interrupt-driven program that C-64 users can add to their collection of programming utilities. Type in the listing with *RUN*'s Checksum, then save it. When you run the program, you're greeted by a screen that lists four new functions assigned to keys F1, F3, F5 and F7.

Pressing F1 stops any function the C-64 is performing, such as executing or listing a program to the screen. After activating F1, F3 resumes execution when it is held down; releasing the key again stops execution. Pressing F5 resumes program execution. Finally, F7 slows down computer operation so that you can examine programs more closely.

Pressing run-stop/restore disables 64 RUN Control, but you can re-activate it with SYS 679. The program is low enough in memory to prevent it from interfering with the operation of other programs.

```
Ø REM 64 RUN CONTROL - RICHARD PENN
                                      :REM*177
1Ø FOR U=679 TO 747:READ Q:POKE U,Q:CK=CK+
  Q:NEXT                              :REM*64
2Ø IF CK<> 8389 THENPRINT"ERROR IN DATA":E
  ND                                  :REM*14
3Ø PRINTCHR$(147)"F1 - PAUSE COMPUTER"
                                      :REM*175
4Ø PRINT"F3 - CONTINUE IF KEY KEY IS HELD
  DOWN"                               :REM*63
5Ø PRINT"F5 - RESTARTS COMPUTER"      :REM*122
6Ø PRINT"F7 - SLOWS DOWN COMPUTER":REM*193
7Ø SYS 679                            :REM*219
8Ø DATA 12Ø,169,18Ø,141,2Ø,3,169,2,141,21,
  3,88,96,165,197,2Ø1,3,2Ø8           :REM*116
9Ø DATA 1Ø,162,1Ø,16Ø,255,136,2Ø8,253,2Ø2,
  2Ø8,248,165,2,2Ø1,1,24Ø,6,165       :REM*199
1ØØ DATA 197,2Ø1,4,2Ø8,13,32,159,255,165,1
    97,2Ø1,5,2Ø8,7,169,1,133,2        :REM*79
11Ø DATA 76,49,234,2Ø1,6,2Ø8,236,169,Ø,133
    ,2,76,49,234,Ø                    :REM*2Ø8
```

—Richard Penn, Montreal, Quebec, Canada

CINEMAWARE

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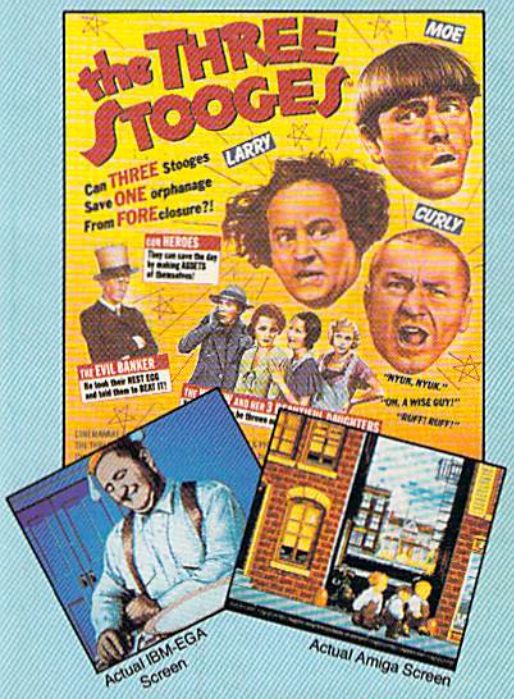

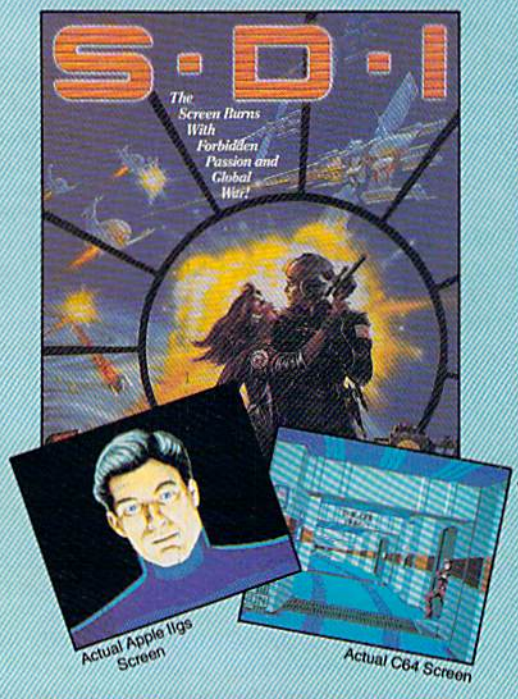

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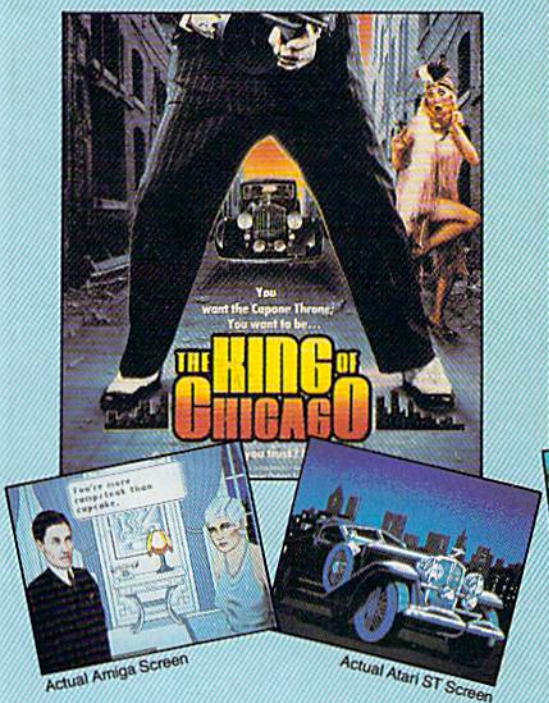

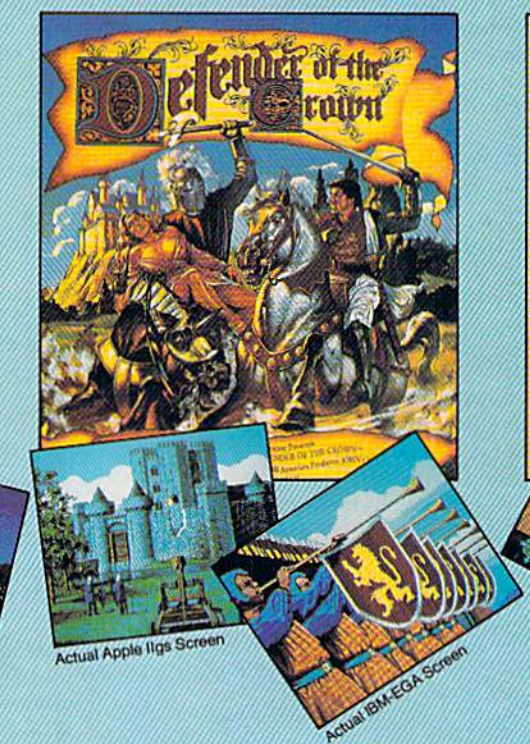

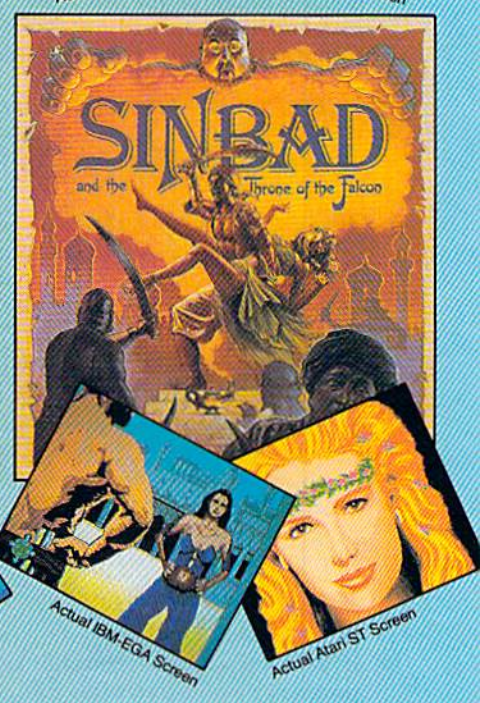

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```
12Ø DATA ,28,,,62,,,62,,,62,,,62,,,62,,7,2
    55,24Ø,14,28,56,3Ø,62,6Ø,54    :REM*157
13Ø DATA 62,54,6,28,48,7,255,24Ø,3,255,224
    ,,255,128,,255,128,,62,,,62    :REM*43
14Ø DATA,,62,,,62,,,62,,,28,,      :REM*172
```

—Joseph Charnetski, Dallas, PA

$4E5 80-Column Insert Mode Cursor

Some IBM computers use a special half-block cursor to indicate Insert mode. My program, Half-Height Insert Cursor, gives the C-128's 80-Column mode the same cursor. Just run my program, and whenever Insert mode (ESC A) is activated, the cursor becomes half-height.

```
Ø REM 8Ø-COL. INSERT MODE ENHANCEMENT - RO
  SS STENERSEN                      :REM*78
1Ø FOR I=Ø TO 58:READ B:POKE 2816+I,B:NEXT
  :SYS2816:NEW                      :REM*238
2Ø DATA 169,11,141,56,3,169,11,141,57,3,96
  ,2Ø1,67,24Ø,7,2Ø1,65,24Ø,13,76    :REM*141
3Ø DATA 193,2Ø1,169,1Ø3,32,42,11,169,67,76
  ,193,2Ø1,169,99,32,42,11,169,65:REM*116
4Ø DATA 76,193,2Ø1,141,43,1Ø,162,1Ø,142,Ø,
  214,44,Ø,214,16,251,141,1,214     :REM*16Ø
5Ø DATA 96                          :REM*2ØØ
```

—Ross Stenersen, Lake Mills, IA

$4E6 Clear Without a Home

C-64 programs and programmers have been without this routine for far too long. Activating it with SYS 49152 clears the screen but retains the cursor's position. Perhaps the greatest potential for this routine will become apparent to programmers who will no longer have to use cursor-down commands after clearing the screen.

```
Ø REM 64 SCREEN CLEAR W/O A HOME - BARRY S
  MITH                              :REM*96
1Ø SA=49152:FORT= Ø TO 19:READ M:POKE SA+T
  ,M:NEXT                           :REM*5Ø
2Ø DATA 162,Ø,169,32,157,Ø,4,157,Ø,5,157,Ø
  ,6,157,Ø,7,232,2Ø8,241,96         :REM*227
```

—Barry Smith, Roanoke, VA

$4E7 64 Shift Key Distinction

Most programmers know that location 653 in the C-64's memory can be used to detect when either shift key is pressed, without differentiating between the left and right keys. Recently, while experimenting with the C-64 joystick registers, I developed a long-sought-after routine that does permit programs to distinguish between the left and right shift keys. The code is as follows:

```
POKE 56323,255:X = PEEK(56320):POKE 56323,0
```

If the value of X equals 125, the left shift key is pressed; if the value is 63, the right shift key is pressed. The following program demonstrates this routine.

```
Ø REM C-64 LEFT & RIGHT SHIFT KEY DETECTOR
  - RICHARD PENN                    :REM*146
1Ø POKE 56323,255:X=PEEK(5632Ø):POKE56323,
  Ø:B$="SHIFT KEY{3 SPACEs}"        :REM*17Ø
2Ø IF X=125 THEN A$="LEFT "         :REM*145
3Ø IF X=63 THEN A$="RIGHT "         :REM*115
4Ø IF X<> 125 AND X<> 63 THEN GOSUB 6Ø
                                    :REM*47
5Ø PRINTCHR$(19);A$+B$:GOTO 1Ø      :REM*44
6Ø PRINTCHR$(147):A$="{HOME}PRESS A ":RETU
  RN                                :REM*8Ø
```

—Richard Penn, Montreal, Quebec, Canada

$4E8 Curing TV Interference

Anyone who has ever used a television for a video display with their computer knows that interference with other TVs, printers and appliances is a constant problem. Here's the best way to minimize interference: Coil as much of your RF cable as possible into a loop about six inches in diameter, then vary the size of the loop until you have the best image on your screen. Use electrical tape to secure the loop behind your computer. You'll never have to worry about the coil becoming undone and losing the improved reception.

—Jim Yeaman, Carlton, Ontario, Canada

$4E9 New C-128 Default Colors

Some impromptu committee at Commodore must have had a strange sense of humor when it selected the pea-soup, green/gray color combination as the default colors on the C-128's 40-column screen. But no matter how pretty you make them with Color commands and Pokes, the same green/gray reappears at the press of run-stop/restore.

My program, New C-128 Default Colors, installs the blue/light-blue color combination used by the C-64. I find it much easier on the eyes. Even when you press run-stop/restore, you will still get the new default colors, not Commodore's. To choose your own default colors, change the two 14s (border and text color) and the 6 (screen color) in the Data statements to any desired values.

```
Ø REM C64 COLORS IN 128 4Ø-COL. MODE - BO
  COCHRAN                           :REM*253
1Ø FOR A=3Ø72 TO 3Ø99:READ D:CK=CK+D:POKE
  A,D:NEXT                          :REM*141
2Ø IF CK<>2581 THENPRINT"ERROR IN DATA..."
  :END                              :REM*187
3Ø SYS 3Ø72                         :REM*139
4Ø DATA 169,11,141,Ø,1Ø,169,12,141,1,1Ø,96
  ,169,14,141,32,2Ø8,169            :REM*212
5Ø DATA 6,141,33,2Ø8,169,14,133,241,76,3,6
  4                                 :REM*214
```

—Bo Cochran, Starkville, MS ■

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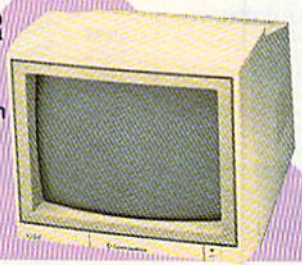

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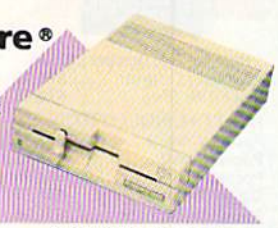

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Fix Your Printer

INDIANAPOLIS—*Printer Troubleshooting & Repair*, a do-it-yourself book for the intermediate to advanced computer user who has a basic understanding of electronics, provides answers to the most common printer repair problems covering dot matrix, ink jet and laser printers.

The 250-page book emphasizes preventive maintenance as well as troubleshooting techniques and includes exploded diagrams and schematics of component parts. Features include how printers work, logic and control systems, print heads, transport mechanisms and a list of sources for replacement parts. The book retails for $19.95. Howard W. Sams & Company, 4300 West 62nd St., Indianapolis, IN 46268.

Check Reader Service number 401.

Don't Shoot Friends

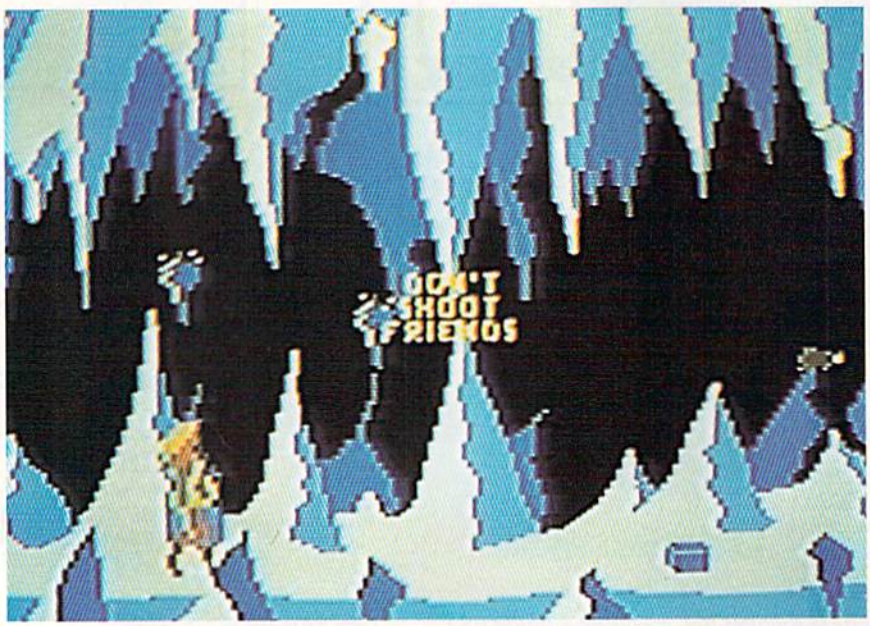
GLEN ROCK, NJ—Crossbow, an arcade game from Absolute Entertainment (PO Box 116, Glen Rock, NJ 07452), is based on the Exidy arcade game. Twelve high-resolution screens and over 100 sound effects bring the monsters and mayhem of the dark ages to life as you conquer deadly terrain and evil enemies. It's available for the C-64 for $34.95.

Check Reader Service number 400.

Blockheads

PLEASANTVILLE, NY—Plain View, a geometry program from Sunburst (39 Washington Ave., Pleasantville, NY 10570) challenges students in grades 4 through 12 to observe, from two viewpoints, a small block moving in a geometric path across the plane of a table top and explore the relationship between the views. Two program options, Learn About Paths and Mystery Paths, enable students first to investigate the way the paths appear from the top (two-dimensional) and from eye level (one-dimensional) and later to identify a path by observing the block from the side view only. A teacher's guide included with the package provides additional classroom activities and worksheets designed to encourage careful notetaking and observation. It's available for the C-64 for $65.

Check Reader Service number 402.



What choices will you make to survive the monsters and deadly terrain in Absolute Entertainment's arcade game, Crossbow?

GEOS + 1541 = New Package

BERKELEY, CA—Commodore International, Ltd. and Berkeley Softworks have announced that a free copy of the GEOS (Graphic Environment Operating System) deskTop is now included with Commodore's 1541 disk drive. The new GEOS deskTop, which includes the GEOS Kernel, desk accessories and a variety of fonts, replaces a previous agreement in which GEOS and GEOS applications were distributed with the C-64 computer.

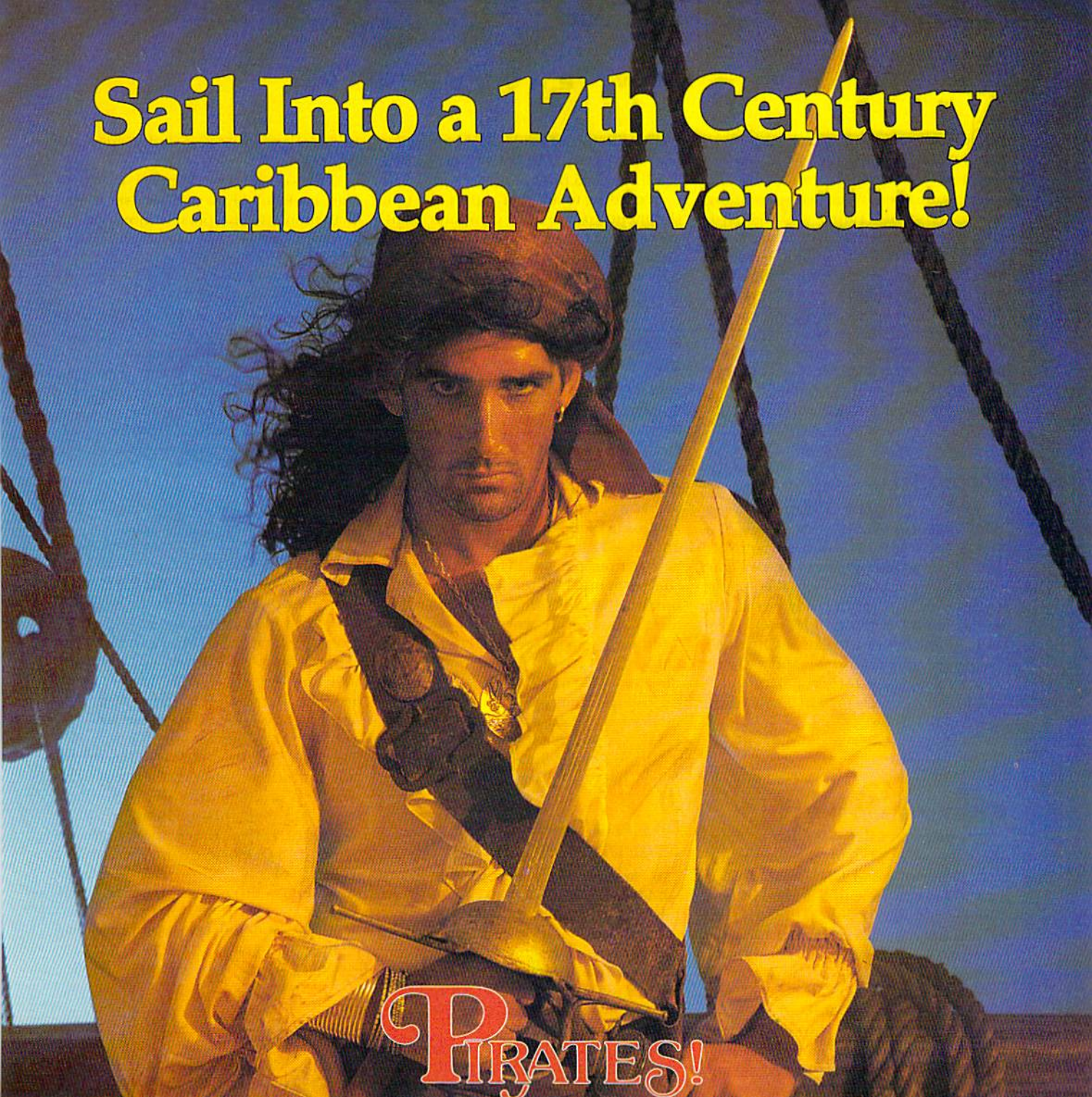
"The new bundling arrangement reflects Commodore's continuing commitment to the GEOS environment for our 64 and 128 computers," said Irving Gould, chairman of Commodore International. "Our inclusion of the operating system without other applications is more consistent with industry norms, and reflects our shared commitment with Berkeley Softworks to support third-party software developers for the Commodore 64 and 128 machines."

Clash of the Titans

REDWOOD CITY, CA—As World War II flying aces, you and other players must destroy the Bismarck so it no longer threatens the free world. Real-time controls, gauges, machine guns, torpedoes and landing procedures must all be mastered before you go on your mission. Then, you'll attack German U-Boats, E-Boats and enemy fighter aircraft that appear out of nowhere. The flight/combat simulation is available for the C-64 for $39.95.

A wild weave through a city subway obstacle course pits you against the clock in Metrocross. You must avoid green slime tiles, leap out-of-control bar- ►

Sail Into a 17th Century Caribbean Adventure!



PIRATES!

MicroProse gives you the real thing. Using the best features of simulation, strategy, and role-playing games, you'll relive the buccaneers' quest for power and prestige. Discover the politics, economics, romance and personal challenges of life on the Spanish Main.

Pirates! will test your reflexes, your cunning and your nerve. It will exceed your *wildest* expectations.

Make your mark, and sign on for the voyage of a lifetime!

ACTUAL SCREENS MAY VARY: IBM/TANDY SHOWN

MICROPROSE

180 LAKEFRONT DRIVE • HUNT VALLEY, MD 21030

Now for Macintosh. Also for IBM PC/Tandy compatibles, Apple IIe, IIc, 128k IIc, Commodore 64/128.

Can't find Pirates? Call (301) 771-1151, weekdays 8am to 5pm EST and order by MC/VISA, or mail check/money order for $44.95 (specify disk size for IBM). U.S. funds only. MD residents add 5% sales tax. Free shipping in U.S., $5.00 international. Allow 1-3 weeks for U.S. delivery.

Circle 135 on Reader Service card.

rels and careening tires and vault high-rise hurdles. To beat the clock, subway sprinters can catapult you along the course and over obstacles by jumping on springboards, riding a skateboard, jumping on tin cans to stop the clock for two seconds or kicking them to double your speed. Test your reaction and coordination skills as you advance to more difficult levels of play that are faster and more furious than the last. The arcade-style action game is available for the C-64 for $24.95. Epyx, PO Box 8020, Redwood City, CA 94063.

Check Reader Service number 404.

Pretty Paper

LONG BEACH, CA—Computer Creations (PO Box 3744, Long Beach, CA 90803) has released Designer Computer Stationery, a line of laser-cut, continuous-feed computer paper. The paper comes with borders of teddy bears, sailboats, lambs, dinosaurs, flowers, seagulls, pumpkin patches or a Christmas theme with gifts, snowmen and a Christmas tree. You can order a package of one hundred sheets for $10.95 plus postage and handling.

Check Reader Service number 403.

Something Different

CARROLLTON, TX—Digiscape Software (PO Box 113058, Carrollton, TX 75011) has released Digital Landscape, which lets you view in 3-D the topography of any area of the United States (excluding Alaska and Hawaii), using the company's Elevation Disks. The 3-D renderings may be rotated 360 degress in one-degree increments in azimuth and tilted from +1 to +89 degrees in declination, and they may be saved to disk for later retrieval. The package is available for the C-64 and C-128 on 5¼- and 3½-inch disk formats for $46.95.

Check Reader Service number 410.

Good News

MOUNTAIN VIEW, CA—The Market Intelligence Research Company (MIRC) says that more than three million personal computers are expected to be connected to local area networks (LANs) by 1993. This strong increase will be due, claims the company, to the maturation of existing pilot programs using LANs.

MIRC also states that revenues for U.S. sales of dial-up modems grew from about $253 million in 1984 to nearly $800 million in 1988. MIRC believes the market will nearly double by 1994 when it will top $1.5 billion.

According to another report, the unit shipments for personal computer printers will more than double from 1987 to 1993, but the dollar market will increase only slightly in that time.

How Much $$ Can You Make?

COLORADO SPRINGS—Investment Simulation Program, Version 2.1 has been released for the C-64 and C-128 by Pyxis Software (PO Box 18016, Colorado Springs, CO 80935). The spreadsheet program computes internal rates of return, equity RORs, present net worth, life-cycle cost and capitalized present value from cash flows covering up to 200 time periods. This new version computes much faster and can save outputs to disk files that can be used by most Commodore word processors. In addition, the package carries six different worksheets for personal and business investment categories, including car, educational and general business investments. A 51-page handbook is included. It's available for $36.

Check Reader Service number 405.

Bits and Bytes From *Science Digest*

ITEM—A study of 185 seventh grade students shows that children from poor families are more interested in computers than children from wealthier families, even though they have less contact with the machines.

ITEM—There are almost four million personal computers hooked to telephone lines in the U.S.

ITEM—Random House has entered a list of computer jargon terms in its second edition of the *Dictionary of the English Language*. Among them are bus, CD ROM, hacker, local area network, modem (both noun and verb forms), MS-DOS, telecommute, user-friendly and vaporware.

ITEM—Washington's newest euphemism is "technology refreshment." Joe Naughton of the National Institutes of Health says, "It works like this: Let's say somebody has bells and whistles, then dingdongs come along, and people realize the dingdongs are better. You replace bells and whistles with dingdongs." Come to your own conclusions.

ITEM—The federal courts have decided that a computer program's look and feel are protected under the copyright law.

ITEM—Verbatim chemical engineer Carlson Koo's "Koo goo" is a substance that simulates the perspiration and oil found in human fingerprints—a major cause of data loss on floppy disks. The company is using "Koo goo" to test its line of Teflon-coated floppies.

ITEM—Scientists in Japan are trying to develop computers the size of a bacterium. Using a scanning tunneling microscope to view the atoms in protein molecules, they hope that small electrical currents will rearrange the atoms to suit their needs, such as making microscopic robots to dismantle and study human tissue.

Put Skara Brae Together Again

SAN MATEO, CA—In The Bard's Tale III: Thief of Fate, third in the series of medieval-based, fantasy role-playing games, the city of Skara Brae has been left in ruins. As the townfolk celebrated a victory over the evil Mangar, his master, The Mad God Tarjan, arrived seeking revenge and reduced the town to rubble. Skara Brae is only the first in a long line of cities that Tarjan has threatened to destroy. Your challenge is to assemble a group of adventurers who will travel through this medieval world in search of Tarjan. If you succeed, Skara Brae will be released from the bond of ruin. If you fail, your world will forever be ruled by Tarjan and his parasitic followers. It's for the C-64 for $39.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404.

Check Reader Service number 408.

Spy for Hire

HUNT VALLEY, MD—MicroProse's (180 Lakefront Drive, Hunt Valley, MD 21030) newest strategy game is Covert Action, where you become a covert agent of either the American, British, French, Israeli or Soviet government. Your agency assigns you to rescue hostages, steal secret documents, sabotage enemy installations and other missions. Price unavailable at press time.

Check Reader Service number 409.

Ready, Set, Go!

ASTON, PA—Family Software (3164 Surrey Lane, Aston, PA 19014) has released PC Tree, a practice-tree software

for the C-64. The program is used to improve driver-reaction time and starting-line consistency in drag racing and other motor sports. Professional and amateur racers can choose between a three-amber .400 Pro or a .500 Full Tree. Individual reaction timers allow simultaneous practice by two users. Features include two large digital readout windows, pre-stage and stage sequence, random start, and an accurate digital rollout adjustment from .000 to .899. The program also automatically calculates and displays your average reaction time. It's available for $34.95.

Check Reader Service number 407.

How Much $$ Can You Lose?

PENFIELD, NY—Spend a day at the track with a full card of ten races with Daily Double Horse Racing. You're provided with a racing form, which includes past race histories of 180 horses and 12 jockeys, competing in nearly 400 races. With this information, you can handicap the races, taking into account the horse, jockey and track conditions. All types of bets are available, from straight wagers to parlays, quinellas, exactas and daily doubles. The races are run with animated 3-D scrolling graphics. The program is available for the C-64 for $19.95 from Artworx, 1844 Penfield Rd., Penfield, NY 14526.

Check Reader Service number 406.

Sticks, Stones, Bones and Electrons

WASHINGTON, DC—What do shepherd's pebbles, a Japanese merchant's soroban, an English tax collector's dipstick and a whiskey barrel have in common? They were the pocket calculators of their day. This and other interesting facts and figures can be found in the new traveling exhibition, "Computer in Your Pocket: The History of Hand-Held Calculators."

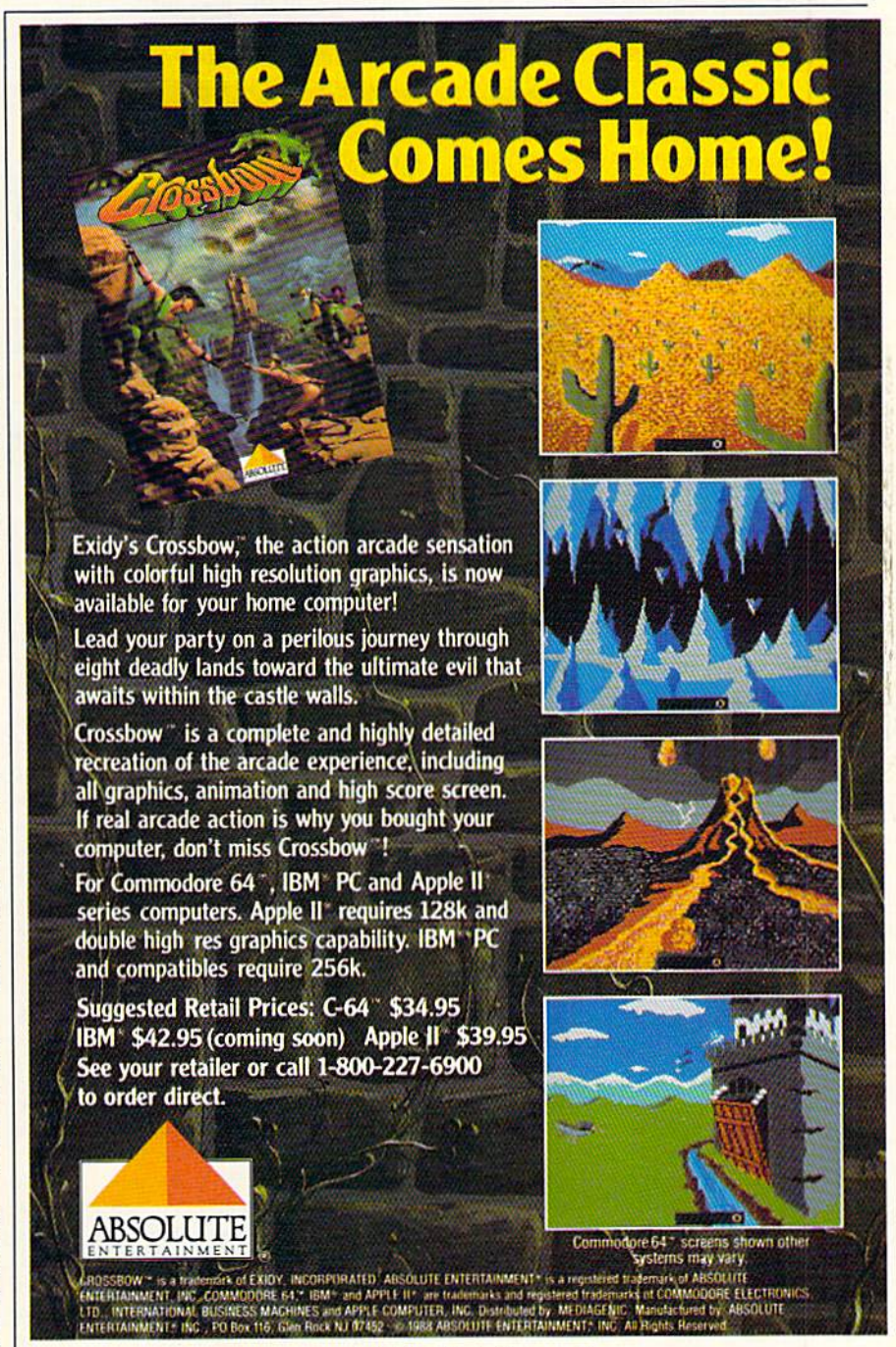
More than 64 rare and unusual calculators used throughout the ages as counting and remembering devices constitute the show. Along with the objects, the exhibition includes eight participatory displays, a video component, historical photographs and panel text.

Organized by The Computer Museum in Boston (Museum Wharf, 300 Congress St., Boston, MA 02210), the exhibition will travel for two years under the aegis of the Smithsonian Institution Traveling Exhibition Service. Funding is provided by Hewlett-Packard.

From such basic systems as finger-counting to state-of-the-art computers, people in all cultures have wanted a pocket-size computer device handy for daily use.

Examples of such devices included in the exhibition illustrate human ingenuity: the oldest mechanical pocket calculator designed by Englishman Samuel Morland in 1666; Napier's Bones (1617), logarithmic-scaled rods that were often made of bone, used by European astronomers and mathematicians for multiplication and division operations; and the first hand-held calculator, the HP35, developed by Hewlett-Packard in 1972.

"Today's inexpensive electronic pocket calculator is less than 20 years old," says Gwen Bell of The Computer Museum. "But the pocket calculator has been around since the beginning of time. Each generation thinks it invented the pocket calculator. But in reality, we only re-invent what we had, using new technologies." ■


The Arcade Classic Comes Home!
Crossbow
Exidy's Crossbow,™ the action arcade sensation with colorful high resolution graphics, is now available for your home computer!
Lead your party on a perilous journey through eight deadly lands toward the ultimate evil that awaits within the castle walls.
Crossbow™ is a complete and highly detailed recreation of the arcade experience, including all graphics, animation and high score screen. If real arcade action is why you bought your computer, don't miss Crossbow™!
For Commodore 64™, IBM® PC and Apple II® series computers. Apple II® requires 128k and double high res graphics capability. IBM® PC and compatibles require 256k.
Suggested Retail Prices: C-64™ $34.95
IBM® $42.95 (coming soon) Apple II® $39.95
See your retailer or call 1-800-227-6900 to order direct.
ABSOLUTE ENTERTAINMENT
Commodore 64™ screens shown other systems may vary.
CROSSBOW™ is a trademark of EXIDY, INCORPORATED. ABSOLUTE ENTERTAINMENT™ is a registered trademark of ABSOLUTE ENTERTAINMENT, INC. COMMODORE 64™, IBM® and APPLE II® are trademarks and registered trademarks of COMMODORE ELECTRONICS, LTD., INTERNATIONAL BUSINESS MACHINES and APPLE COMPUTER, INC. Distributed by MEDIAGENIC. Manufactured by ABSOLUTE ENTERTAINMENT® INC., PO Box 116, Glen Rock NJ 07452 © 1988 ABSOLUTE ENTERTAINMENT® INC. All Rights Reserved.
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MAIL RUN

Readers want more C-128 software and question the Commodore market's emphasis on games.

WE WANT MORE CP/M!

I think *RUN* is giving too much attention to games and no attention at all to CP/M productivity programs. In July's Software Gallery, you reviewed seven games, yet I've never seen you review such CP/M programs as dBase, Multiplan, Grammatik, PFS Write or WordStar 4, nor articles about CP/M word processors, spreadsheets, spelling checkers, grammar checkers or databases. In fact, I've learned more about CP/M from CP/M help files and Mail RUN than from any articles in your magazine! I never would have known WordStar exists if I hadn't read about it in Mail RUN. CP/M is just as important as GEOS or telecommunications and deserves its own column, frequent articles and reviews.

—ERIC J. ROMERO
BROOKLYN, NY

I recently bought a C-128. I have been told by many people that there are vast amounts of CP/M software available for it. Why have I not seen advertisements in *RUN* promoting CP/M software? If I have, I'm having difficulty identifying what *is* for CP/M.

—STEVE ASLAN
THE PHILIPPINES

From time to time, RUN *publishes sources for public domain software, much of which is in CP/M mode. For example, see several letters from users in our Mail RUN for May, 1988 (p. 24) and page 85 in the April issue.*

—EDITORS

C-64 ADS

I've been using the C-64 Assembler Development System for about three years now, so I was glad to see the review of it in "The Assembly Line" by Michael Broussard in last May's issue of *RUN*.

My experience with the assembler has revealed a number of bugs. For instance, the monitor does not exit to Basic as did earlier Commodore ROM-based monitors. The editor crashes if I try to specify an I/O device. Also, the assembler does not multiply correctly in expressions, and macros cannot contain directives.

My copy of the package has been repaired, and it turned out that the bugs arise from about two dozen coding errors in the various programs. There are also some documentation flaws. For example, the assembler *does* have a conditional assembly capability.

But I'm fairly happy with the package; it's simple, but it does the job. I would be happy to discuss with other owners of the package what is needed to get it repaired at no cost. Those interested should leave E-Mail on the RUNning Board (603-924-9704) or write to me at 4718 Maychelle Drive, Anaheim, CA 92807-3040.

—BRUCE L. FELLOWS
ANAHEIM, CA

Thanks for the offer, Bruce.

We asked Commodore's Senior Systems Engineer, Fred Bowen, about the problems you'd been having with your development system. The newer version of the system (#080282) has none of the problems that you've experienced, so you probably have an older version.

In the newer version, the monitor program does correctly exit to Basic, the editor program does allow device selection (although the documentation does not explain that the default device is the last unit specified) and the assembler macro facility does allow directives within the macro proper. Further, the documentation does discuss conditional assembly and provides an example of a macro containing a directive. Also, there are no errors in using multiplication in various expressions. Thanks for the information, Fred.

—EDITORS

I AGREE

I own a C-128, and I couldn't agree more with the viewpoint Gary McKay expressed in his letter (Mail RUN, "Where's the C-128 Software?," August 1988). It does indeed make sense to produce software for the 128 for one simple reason: to make the best software possible. Why should someone settle for C-64 software when better software is (or should be) available? If there were more 128 games, I'd be buying more games. It wouldn't simply be a matter of buying a 128 game over a 64 game; I would spend more money buying games and I'd purchase almost exclusively from the companies that make 128 software.

—MATT HARREL
TOLEDO, OH

READ THE POLLS!

I read with interest the results of polls taken of Commodore computer owners, and it makes me wonder if anybody at Commodore Business Machines or the publishers of Commodore trade magazines really understand the statements made by these polls.

The results published in the June 1988 issue of *Q-Link Update* echo the results of all the polls I've seen, some four or five so far this year. The salient points are:

- 67 percent of Commodore computer owners are over the age of 35.
- Over 40 percent are in professional/management careers.
- Over 80 percent have attended college.
- 70–80 percent have annual incomes over $30,000.
- Interests are in building work skills.
- The number of young students is less than 20 percent.

But if one looks at the marketing by Commodore and ads in trade publications, it would seem that all owners are teenagers addicted to arcade games—period. The median age of the Commodore Houston User Group must be in the high forties. When a vendor demonstrates game software at a group meeting, attendance is low; but when productive or creative software is demonstrated, it's standing room only.

So, companies that listen to what consumers want and then provide it are successful. And, if I read the results of the polls correctly, the providers are headed in one direction and the consumers in another. In the end, the consumers will have their way, but it may not be with developers of Commodore software.

—JAMES H. KNAUSS
HOUSTON, TX

After reading the results of the survey compiled by *RUN* (RUNning Ruminations, July 1988), it was encouraging to see that not all owners of C-64s are students using their machines to play games.

I'm 38 years old and would love to see more articles on how different users employ their software and how business people set up their programs. For example, I've been a Calc Result user for years. It would be interesting to see what kinds of templates might have been developed for this spreadsheet, or any other spreadsheet, for that matter. Maybe you could run some articles on how a doctor, lawyer, teacher, restaurateur or insurance agent uses his or her machine. This would be the productivity I think readers would like to see.

—MONTE R. SMITH
BILLINGS, MT

DATABASE DECISION

I've been having difficulty using two commercial databases to update C-64 files to my C-128, so I'm in the market for a new database. I'm considering Timeworks' Data Manager 128. Can you direct me to information on this or other databases?

—TOM BOYDEN
GARLAND, TX

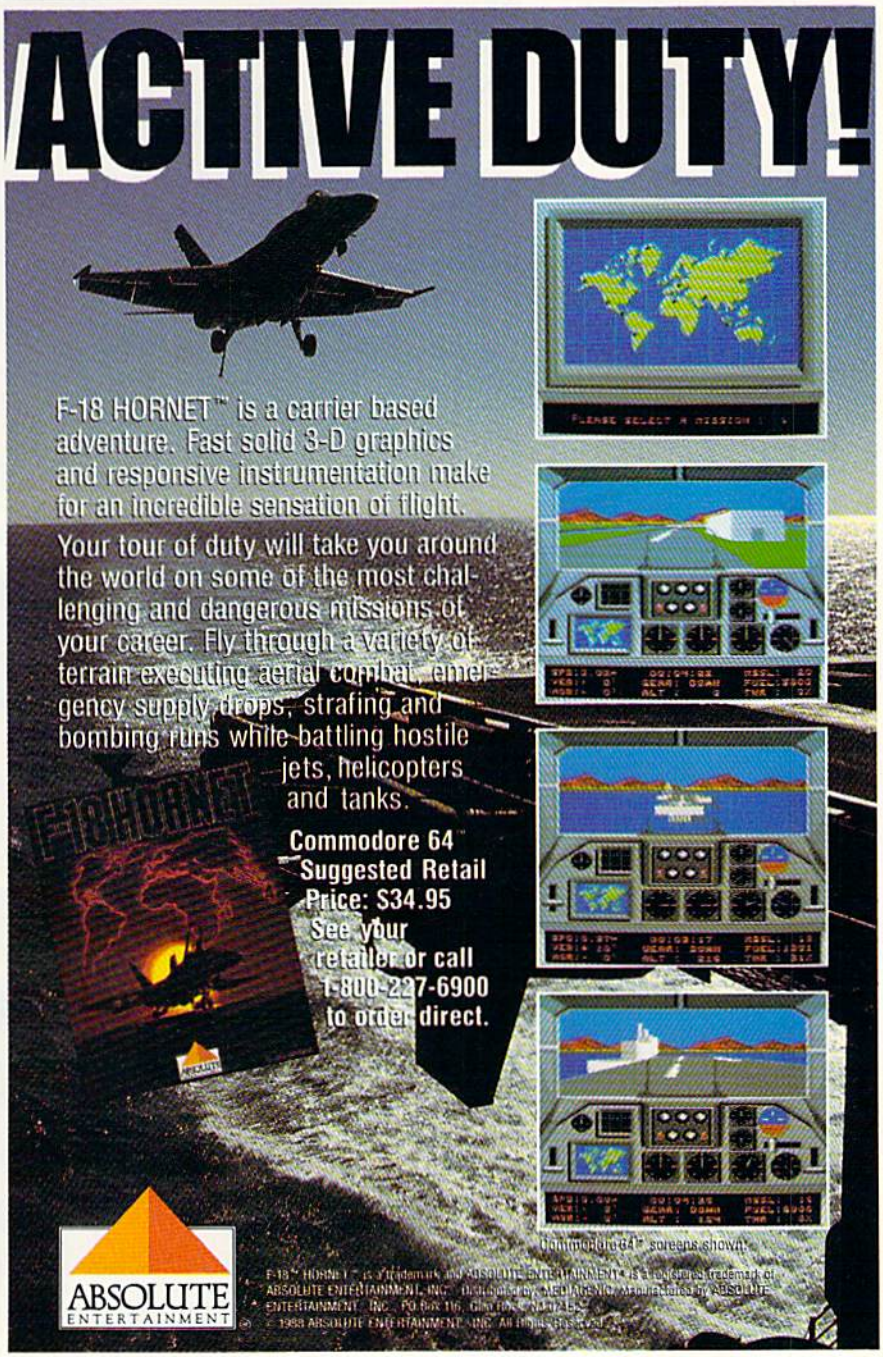
See the article, "Database Decision," in the October 1987 issue of RUN *for a roundup of several leading databases.*

—EDITORS ■

MINI RUN AMOK

Item: In Table 2 on page 63 of our August 1988 issue, the price for Fast-Load was stated incorrectly. It should have read $39.95.

Item: In Table 1 on page 40 of the September issue, the telephone number for R.J. Brachman Associates (Serial Box) should be 215-499-7475.


ACTIVE DUTY!
F-18 HORNET™ is a carrier based adventure. Fast solid 3-D graphics and responsive instrumentation make for an incredible sensation of flight.
Your tour of duty will take you around the world on some of the most challenging and dangerous missions of your career. Fly through a variety of terrain executing aerial combat, emergency supply drops, strafing and bombing runs while battling hostile jets, helicopters and tanks.
Commodore 64 Suggested Retail Price: $34.95
See your retailer or call 1-800-227-6900 to order direct.
F18HORNET
Commodore 64™ screens shown.
ABSOLUTE ENTERTAINMENT
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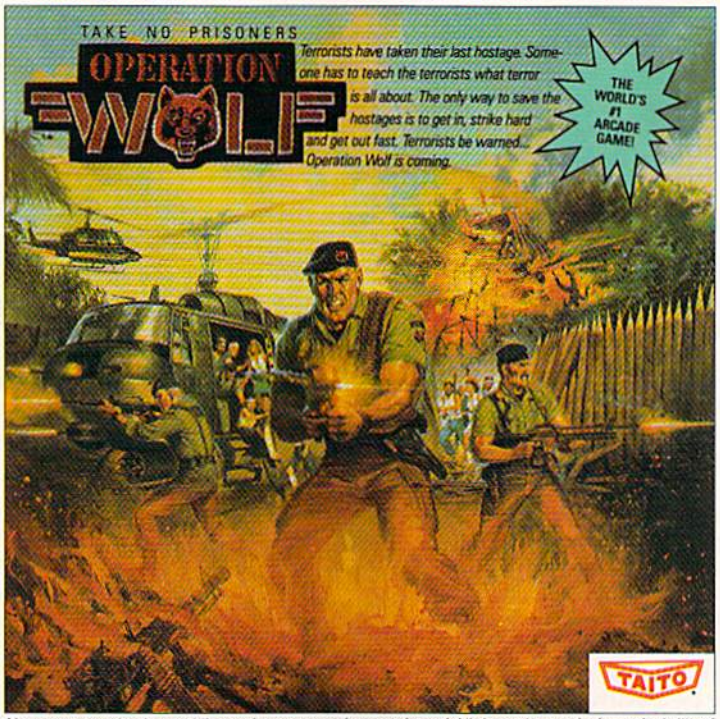
SEVEN WAYS TO MAKE YOUR COMMODORE SCREAM

1) EXPLOSIVE COMMANDO RAIDS.


TAKE NO PRISONERS
OPERATION WOLF
Terrorists have taken their last hostage. Someone has to teach the terrorists what terror is all about. The only way to save the hostages is to get in, strike hard and get out fast. Terrorists be warned... Operation Wolf is coming.
THE WORLD'S #1 ARCADE GAME!
TAITO

Now you can take the world's number one arcade game home! All the action-packed arcade thrills of this awesome hostage rescue are ready for home video play.

2) SUPER-HUMAN WARRIOR LORDS.

VENTURE TO AN ANCIENT WORLD OF DANGER
RASTAN
In a mythical land of death and adventure, survival is always a breath away. Slay deadly dragons. Capture life-giving magical power signs and conquer the mighty Castle King. Be sure. Be swift. Be brave. You have the power to triumph...use it well.
TAITO

Now you can thrill to one of the biggest-ever coin-op hits on your home computer. Rastan's mind-blowing graphics takes you to a magical land of adventure and excitement.

THE ONLY GAME IN TOWN.™

TAITO

COMING SOON, THE CLASSIC MIND GAME, QIX.

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3) BUBBLE BLOWING DINOSAURS.

The #1 game in Europe for 3 months. Scramble through 100 screens as your brontosaurus buddies, Bub and Bob, drive you crazy with non-stop action.

4) DEATH-DEFYING ACES.

Take the arcade's meanest air battle home for keeps. Strap in for explosive high-flying action. Hold on for your life as you soar through incredible graphics.

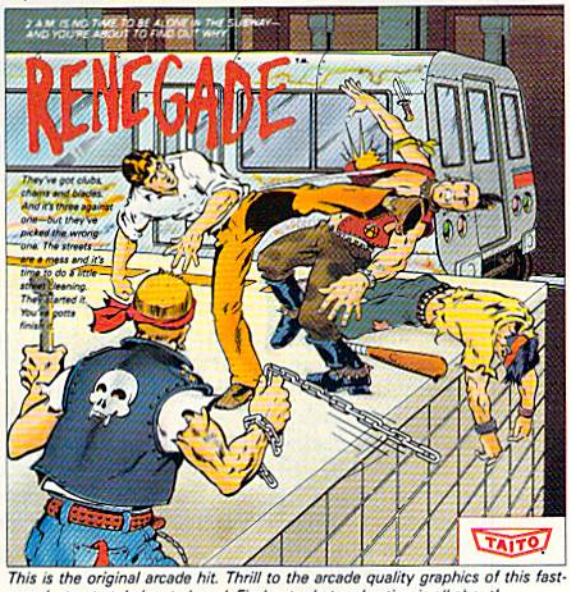
5) INTER-PLANETARY WARFARE.

Now you can blast into one of the hottest arcade space games right in your own home. It's the ultimate inter-planetary combat. You've never seen action like this.

6) OUTER SPACE GRID MONSTERS.

Don't settle for imitations. The game voted "one of the best home video games ever" by Electronic Game Player Magazine is ready to blast into your home.

7) RAGING STREET RUMBLES.



This is the original arcade hit. Thrill to the arcade quality graphics of this fast-paced, street-style karate brawl. Find out what real action is all about!

Taito games will make your Commodore scream with the sights and sounds of arcade action, adventure, survival, destruction, heroes, villains and heart-pounding thrills.

These are the world famous arcade originals and they're ready to wail on your Commodore. Arkanoid,™ Alcon,™ Bubble Bobble,™ Operation Wolf,™ Rastan,™ Renegade™ and Sky Shark™ will make your Commodore do things you didn't think were possible.

Everyone knows that arcade games are the benchmark for all other video games and Taito has been an arcade leader since 1953. Since then we've made over 1,000 classics for arcade and home play. Count on Taito to bring the heat of the arcade to your home computer.

Buy Taito products at leading stores everywhere. Visa/MasterCard holders can order direct anywhere in the U.S. by calling 1-800-663-8067.

SOFTWARE GALLERY

This Thanksgiving, our computer turkey is stuffed full of role-playing, war and arcade games, with graphics and astronomy added for spice!

Compiled by BETH S. JALA

WIZARDRY: PROVING GROUNDS OF THE MAD OVERLORD ..... A–

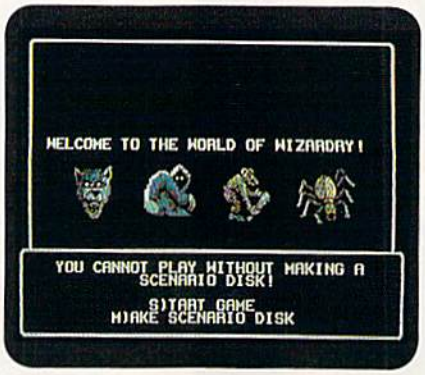
Can You Make Your Way To the Innermost Depths Of the Dungeon?

Many sword and sorcery entertainments are humorless and dull. And it's easy to smirk at products that liberally mix allusions from various cultures and legends. But Wizardry rises above its use of hobbits, ninjas and Gilgamesh's Tavern. Wizardry is more sophisticated—and more amusing—than other fantasy adventure games. This is no mere mapping game, where a player goes about finding keys and gold. In Wizardry, you journey with teams of multi-dimensional characters into a surprisingly complex landscape.

You determine each player's race (human, hobbit, elf, dwarf, gnome); statistics (intelligence, agility, luck); and profession. You name all characters, so you can send anyone you like (or dislike!), from Ronald Reagan to your third grade teacher, into the maze. Furthermore, you can play with good, evil or neutral characters. All of these factors influence the game, and, as you play, a character's reactions to computer-generated events are altered by experience, possessions and age, as well as by fluctuating, spell-casting abilities.

This role-playing game takes you, in the initial program of the series, into the Proving Grounds of the Mad Overlord in search of treasure and the evil wizard, Werdna. The landscape includes a tavern, an inn, a trading post and—my favorite—the Temple of Cant, where dead characters who have the cash can be resurrected.

The Edge of Town leads to the maze itself, and what a maze it is! It includes plenty of treasure-guarding monsters like Bubbly Slimes, Skeletons, Orcs and Fire Giants. There are ten levels of private elevators, buttons to press



You'll come face to face with interesting creatures in the Wizardry maze.

and strange, shadowy areas. Smart players keep track of where they are with the "map plotting aid" (graph paper) included with the program.

There's a price to pay for this complexity. Getting started is slow: With a single disk drive, it takes about 30 minutes to prepare a new scenario disk. Also, in every new game, the player really needs to call up or create appropriate characters. If you've been away from the game for a while, there aren't nearly enough on-screen prompts to get you quickly going again.

So how is the new Wizardry adventurer to make sense of all this? Thank goodness for the manual. It establishes the environment with a friendly, humorous tone. Although it lacks an index, it does include a chatty step-by-step journey into the maze, along with handy tips for surviving the initial forays. Adventurers who are truly "stuck" have recourse to a "hotline support system"—a phone number available seven days a week.

For those adventurers caught up in the quest, other scenarios are available, and more will be forthcoming. Even the most rooted-in-reality skeptic will find him- or herself pulled into the Proving Grounds of the Mad Overlord, at least for a session or two. So head on over to Gilgamesh's Tavern soon. You might find yourself on a very long journey. *(Sirtech Software, Inc., PO Box 245, Charlestown Ogdensburg Mall, Ogdensburg, NY 13669. C-64/$39.95.)*

—SHARON G. WEINER
CHICAGO, IL

IMPOSSIBLE MISSION II ..... A–

Top-Notch Sequel Marks Return of Evil Elvin

Somersaulting secret agents, suicidal sentry robots and searches for security codes are just a few of the stunning ►

REPORT CARD

A Superb!
An exceptional program that outshines all others.

B Good.
One of the better programs available in its category. A worthy addition to your software library.

C Average.
Lives up to its billing. No major hassles, headaches or disappointments here.

D Poor.
This program has some problems. There are better on the market.

E Failure.
Many problems; should be deep-sixed!

YOUR BATTLESHIP JUST BIT THE BIG ONE.

Now, you're mad. Really flamed. So assess your losses, aim your guns and turn your enemy into fish food.

ONE OF THE MOST POPULAR GAMES OF ALL TIME COMES TO LIFE ON THE COMPUTER.

As commander of a powerful naval fleet, you'll see destroyers and carriers sinking in a cloud of smoke. Watch planes strafing by so low, you'll practically feel the pilots breathing.

Commodore 64/128, Amiga, Atari ST, IBM PC and compatibles
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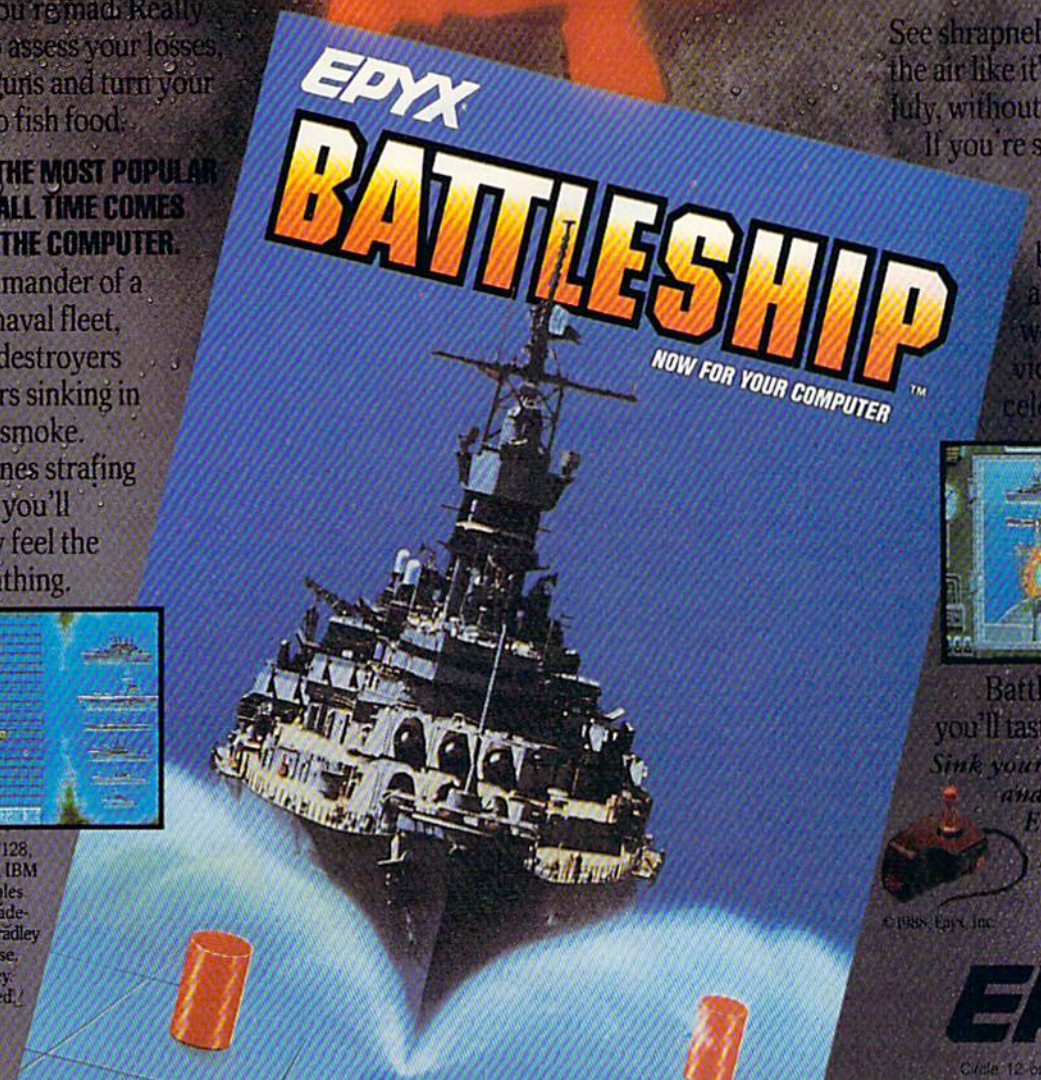
Screens from Atari ST.



See shrapnel flying through the air like it's the 4th of July, without a picnic.

If you're still floating when it's all over, you'll be honored in a glorious, well-deserved victory celebration.

Battleship. So real, you'll taste the salt water.

Sink your opponent faster and easier using an EPYX high performance joystick.

©1988 Epyx, Inc.

EPYX®

Circle 12 on Reader Service card.

elements that make Impossible Mission II a very special piece of software.

The only problem with Epyx's action/strategy game is that it contains so many elements and variables that it's a little difficult to get into. Before tackling this Impossible Mission, prepare yourself to spend an hour or two just becoming familiar with the game's many features. An instruction manual that's somewhat vague—perhaps intentionally so—doesn't help matters. Fortunately, hitting run-stop can pause a game, and there are also features to let you reset or save a game.

Your objective in Impossible Mission is to guide your on-screen character, a secret agent, through an eight-tower high-rise complex that serves as headquarters for evil genius Elvin Atombender. It is feared that Atombender will destroy the world, and it's up to you to stop him.

To do so, you have to get to his control room at the core of the tower complex by searching every room of every tower and seeking numerical and musical security codes that must be assembled on your special pocket computer.

If that was all it took to complete your quest, this mission wouldn't be nearly as impossible as it is. One of the biggest problems is that each room in the tower is guarded by various types of robots that must be destroyed or avoided. Each room also features various structural obstacles that make it very difficult to reach the objects you must search for security codes.

Fortunately, those objects can conceal weapons and tools for you to use in your quest. In some cases, they'll help you overpower or outwit the sentry robots; in others, they'll help you gain access to an otherwise unreachable part of the room. Among the useful items you might find are bombs, land mines and switches that turn off the robots.

Whether you're blowing up robots or just shutting them down, you'll have to do it quickly because you have a limited amount of time to complete your mission. Allegedly, you have eight hours, but the countdown clock doesn't work in real time. In reality, depending on how often you pause the game, you have more like 20 or 30 minutes to stop Atombender.

After you complete your mission or time runs out, a scoreboard reveals the points you scored. Points are awarded for entering rooms and towers, searching for objects and completing a mission. The best scores are saved to disk.

Impossible Mission is a one-player game in which response to joystick input is superb. The only time response lags is when you're trying to place a time bomb; it often takes repeated attempts, which is difficult when deadly robots are bearing down on you.

The movements of those robots and your secret agent are a pleasure to behold. Epyx has produced a number of outstanding sports simulations, and Impossible Mission follows in the tradition of their impressive animation.

The graphics are first rate. The concept of the game doesn't lend itself to the type of eye-popping graphics that knock your socks off, but the drawing is nevertheless state-of-the-art.

Those elements make Impossible Mission a very addictive game. If you like complex challenges and don't mind putting a little effort into learning a new game, you're likely to spend many enjoyable hours avoiding deadly robots and looking for that evil genius, Atombender. *(Epyx, Inc., 600 Galveston Drive, PO Box 8020, Redwood City, CA 94063. C-64/$39.95.)*

—SCOTT WASSER
WILKES-BARRE, PA

AWARD MAKER PLUS ..... A

Give Yourself an Award For Creativity!

Being first on the market with a new program concept isn't always an advantage. More often than not, using more advanced programming techniques, newer products include distinct improvements over originals.

Examples of the borders and fonts you can use in Award Maker Plus.

A case in point is Baudville's Award Maker Plus, a program similar to Springboard's outstanding Certificate Maker, but with all the enhancements of second generation software.

With Award Maker Plus, creation of a certificate or award is simple. The first step is choosing from the 286 templates, four of which accept hi-res graphics from Doodle!, Screen Magic or other programs with 32-disk-block bitmap files. In addition, employing graphics transformer programs makes it possible to use almost any artwork, including Newsroom clip art.

Next, you select one of four available fonts—Script Italic, Old English, Book Serif or Modern—with which to enter the title. From there, a different font can be used for the name and text, and signature and date lines can be added. The final step is border-pattern selection—gothic, trefoil, frame or one of seven others—and border color, if a color printer is available.

The print quality of Award Maker Plus is outstanding; it maximizes the limits of a dot matrix printer. The information on such an award has the appearance of a carefully crafted, hand-printed document. If you use special paper, such as parchment, this greatly enhances the look and feel of any award.

Normally, programs like this tend to run quite slowly, but Award Maker Plus is quick because it uses a single load-and-print routine. Certificate Maker, which loads information and prints the document in several sections, takes quite a bit more time to run. I timed the loading and printing of one full-page award created with Award Maker Plus. It took seven minutes to load the template and data and approximately eight minutes to print.

Using templates limits the number of certificate choices available, but hopefully Baudville will release an additional template disk and another font and border disk.

Even if you already own Certificate Maker, the enhancements in Award Maker Plus will make it an exceptional addition to your software library. *(Baudville, 5380 52nd St., Grand Rapids, MI 49508. C-64/$39.95.)*

—STEVE FISHBEIN
NEWPORT NEWS, VA

STREET SPORTS SOCCER ..... A–

Hit the Streets Again for Some Bumping, Banging Fun!

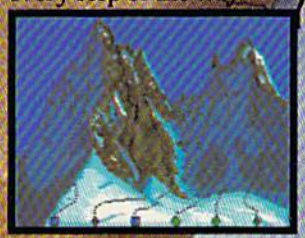
My first reaction to the third entry in Epyx's Street Sports series was, "Who are they trying to kid?" ►

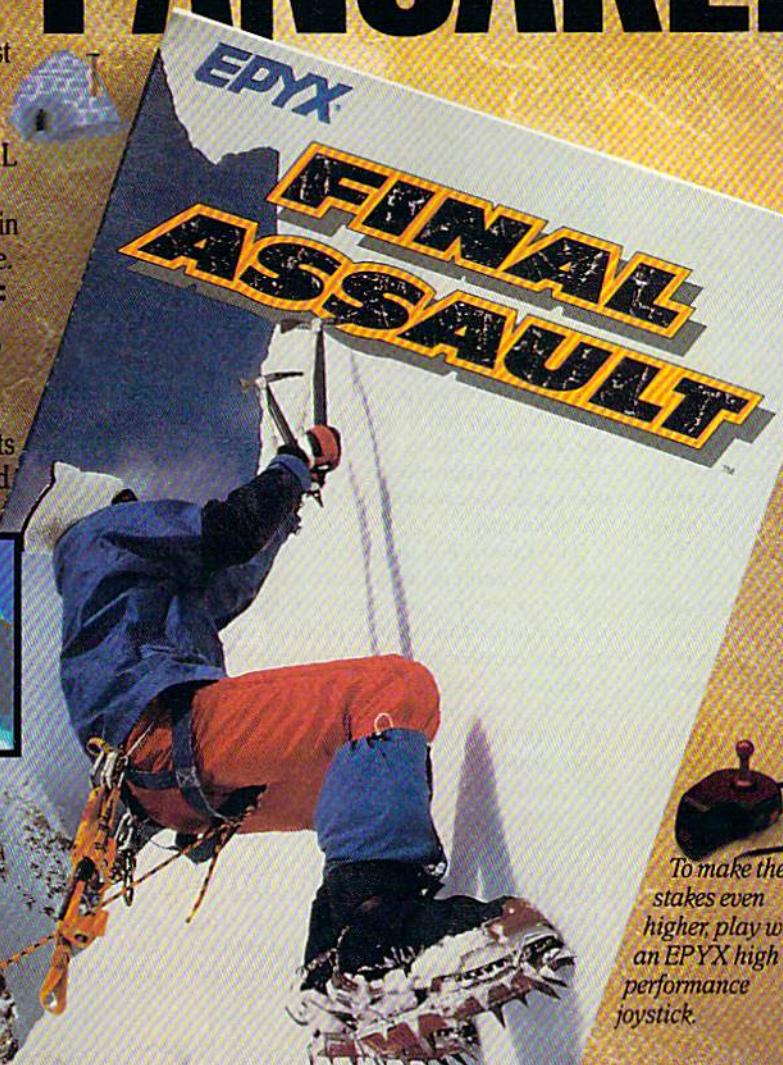
ONE MISTAKE AND IT'S THE BIG PANCAKE.

You're at the foot of one of the world's highest mountains. And you're not snapping pictures. Because this is the FINAL ASSAULT. The only mountain climbing game in the Alps or anywhere else.

IF YOU'RE AFRAID OF HEIGHTS, FORGET IT.

You'll experience the terror and elation of one of the most grueling sports ever. And you'll be tested every step of the way.





Did you pick the right course? (There are six treacherous possibilities.)

What about supplies? If you run out of soup, you'll be stuck with snow sandwiches.

Forget your spikes or ice picks? You could end up a permanent part of the scenery.

If you have nerves of steel, even when you're dangling 40 feet off a cliff, you might just be one of the lucky few to plant your flag at the peak.

To make the stakes even higher, play with an EPYX high performance joystick.

© 1988 Epyx, Inc.

Commodore 64/128, Amiga, Apple IIGS, Atari ST, IBM & compatibles. Screens from Atari ST.

EPYX®

Circle 153 on Reader Service card.

Street Sports Baseball and Basketball I could understand. After all, practically everyone has played sandlot baseball or playground basketball. But Street Sports Soccer? Unless you live someplace like Paris or Rome, you're not likely to find a bunch of kids hanging out in the street banging a soccer ball around.

So, I was quite surprised to get a big kick out of Street Sports Soccer. The elements that weigh in the program's favor are the same characteristics that you find enlivening all good computer sports simulations: quick and accurate joystick response, realistic animation and graphics and a variety of play options.

Soccer has certain features that typify the Street Sports line of programs. As in Baseball and Basketball, the on-screen characters playing the games are picked from a roster of neighborhood kids. Each one has a particular skill or trait that distinguishes him. Picking players who complement each other is as important as good eye-hand coordination or choosing a good game strategy.

For the playing area, you may choose a city street or an empty field in the park. You won't kick too many balls out of bounds on the street because it's lined with buildings and obstacles like pot holes and garbage can covers. And watch out for that mudhole in the park!

A nice aspect of the game is the fact that each team consists of just two forwards and a goalie, as opposed to the 11 players that make up a real soccer team. The shortage of players is not a problem, because it would be virtually impossible to control 11 with one joystick anyway.

The joystick controls only the player with the ball. When the ball is passed, the computer automatically switches control to another player. Like other games in the Street Sports series, Soccer features a simple, yet effective, set of joystick commands, and response to input is excellent. If you lose a game, it's because you put a weak team on the field or simply messed up on your joystick jockeying.

The animation is also outstanding. Character movement is very realistic; the screen scrolls smoothly from one side to the other as players rush up and down the field.

My only complaint is with the perspective, which is from one sideline high above the field. The on-screen characters appear very small, which doesn't affect playability, but makes the game less enjoyable from an aesthetic standpoint.

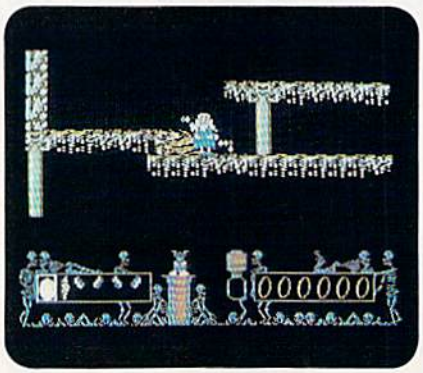
It certainly doesn't keep the program from being a lot of fun. You may not find many American kids playing sandlot soccer, but with participation in youth programs around the country booming, someday you just might. Epyx may have jumped the gun a bit, but the end result is worth it. *(Epyx, 600 Galveston Drive, PO Box 8020, Redwood City, CA 94063. C-64/$39.95.)*

—SCOTT WASSER
WILKES-BARRE, PA

VAMPIRE'S EMPIRE ..... B–

The Setting is Transylvania—Halloween Lives On!

You are Dr. Van Helsing. Your mission in life is to find and destroy Dracula. Over the years, you've learned that garlic wards off all but the most determined of



Try to make your way through Dracula's lair in Vampire's Empire.

the undead. Sunlight, however, is the ultimate weapon against vampires. An old gypsy woman has taught you the way to use a magic ball to capture and direct beams of sunlight. With the ball, mirrors and garlic, you're prepared to enter Dracula's cavern.

The cavern is a seemingly endless series of chambers, stairs and walls, making it easy to get lost. Progressing deeper into the bowels of this underground empire, you encounter a variety of demons. Some can be driven off with a swift kick; others must have pieces of garlic thrown at them. At the same time, you have to strategically place mirrors and employ the magic ball, trying to move ever closer to the heart of Dracula's lair.

DigiTek designed Vampire's Empire with their tongues firmly planted in their cheeks. The characters are cute rather than frightening. As opposed to the suave figure cut by Peter Cushing in the Dracula films of the 1960s and 70s, this Dr. Van Helsing looks like a grandfatherly gnome. Even the menacing monsters have a certain Smurf-like quality.

While easy to learn, Vampire's Empire takes time to master. You'll need a few turns just to familiarize yourself with the layout of the cave, to find out which monsters are repelled by garlic, which can simply be kicked out of the way and which have to be avoided—and to learn to use the magic ball and mirrors.

Vampire's Empire is a strategy/adventure rather than an arcade game. Patience is the virtue that brings rewards, not lightning-fast trigger fingers. It probably won't appeal to those who prefer the intricacies of a Bard's Tale or the complexities of Zork. You can play Vampire's Empire for 20 minutes, put it on the shelf, and then play it again a couple of weeks later without feeling unduly lost or confused.

Directions for moving the characters and using the objects are brief, but complete. The joystick control is good, character movement is crisp, and the graphics scroll smoothly. A blurb on the back of the package boasts that there are over 240 screens. However, I found most of them to be so much alike that it was often difficult to tell whether I was wandering in circles or had entered an area very similar in design to one I had just left.

Adults and older adolescents might not be that excited by Vampire's Empire. It has neither the complexity nor the eye-grabbing graphics of some other currently available software. However, younger children who are tired of being shot, blasted or blown up should find this an interesting alternative to annihilating aliens. *(DigiTek, Inc., 10415 N. Florida Ave., Suite 410, Tampa, FL 33612. C-64/$29.95.)*

—MICHAEL CAVANAUGH
LEVITTOWN, PA

ROADWARS C

Wanted: Battlespheres With Swift Reflexes for Futuristic Highway Patrol

Roadwars begins with an interesting tale of space warfare in the 25th century. The planet Sarac has been destroyed, and people have been forced to live on the five moons surrounding it. The moons are linked by a series of highways where traffic is controlled by computers ►

TEST DIVE ONE FOR YOURSELF.

In their day, they ruled over three quarters of the earth's surface.

During WWII, they viciously brought Britain to her knees. And Japan to the ground.

These were the silent killers: Tench. Gato. U-Boat.

And now, they return. In this, the most realistic, all-encompassing simulation ever created for the personal computer.

You will command one of six types of American subs or German Kriegsmarine U-Boats, during any year from 1939 to 1945. You'll perform one of over 60 missions. Or you'll engage in the most difficult task of all: To make it through *the entire war.*

Each vessel is completely unique and painstakingly authentic, so you'll have a lot to learn: Navigation. Weather. Radar.

TAKE OUR PREVIEW DISK FOR A SPIN. *Drop this coupon in the mail with your check or money order payable to Epyx, and we'll gladly send you to the South Pacific to have it out with an enemy fleet.*

Mail to Sub Battle Preview, SoftMail, 2995 Woodside Road, Suite 400-383, Woodside, CA 94062.

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013

And the contents of a vital target book, among other things.

Your arsenal will include deck and anti-aircraft guns. Torpedoes. And mines.

But even all that may not be enough.

Because besides the risk of bumping a depth charge or facing a killer Destroyer, you'll still have to contend with the gunfire of enemy aircraft.

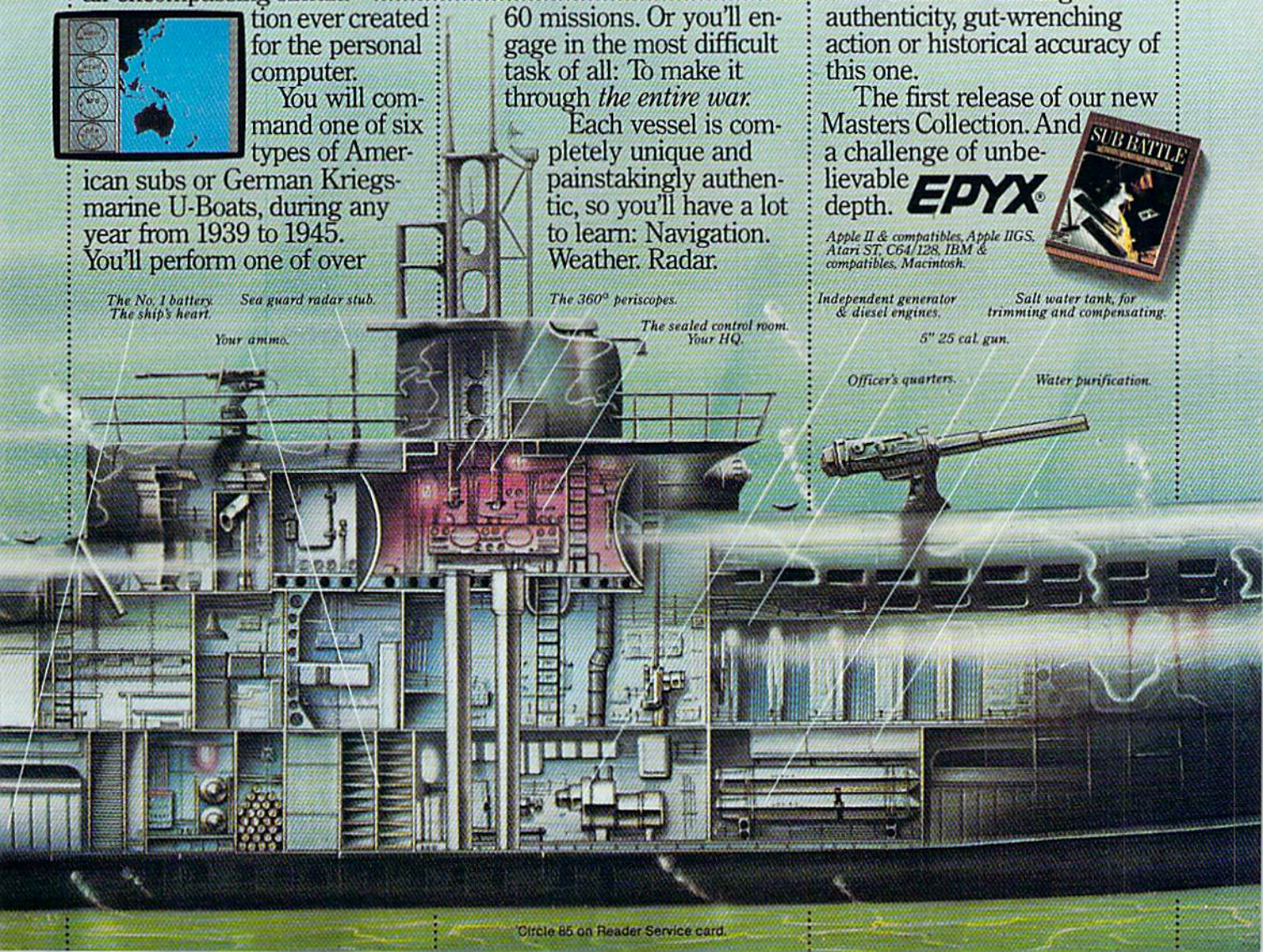
No simulation has ever had the degree of authenticity, gut-wrenching action or historical accuracy of this one.

The first release of our new Masters Collection. And a challenge of unbelievable depth.

EPYX®

Apple II & compatibles, Apple IIGS, Atari ST, C64/128, IBM & compatibles, Macintosh.

The No. 1 battery. The ship's heart.
Sea guard radar stub.
Your ammo.
The 360° periscopes.
The sealed control room. Your HQ.
Independent generator & diesel engines.
Salt water tank, for trimming and compensating.
5" 25 cal. gun.
Officer's quarters.
Water purification.



Circle 85 on Reader Service card.

that have suddenly gone out of control. Two robot droids, called Battlespheres, are being used to clear various destructive obstacles from the roads. You direct one of the two spheres; the other is controlled by either a second player or the computer.

Your weapon is a laser cannon that's used to destroy the laser-firing satellites, the balls that are rushing at you from the highway and the road-side panels that send out lethal sparks. Your battlesphere has shields that offer limited protection; but encounter too many sparks, laser blasts or collisions, and you're finished!

The instructions state that the basic movements—opening and closing the shields, aiming the cannon to the left or right and moving the battlesphere to the left or right—are accomplished with a joystick or the keyboard. However, the accompanying diagram shows six movement controls for the joystick and only four for the keyboard. You're also instructed to plug the joystick into port 2 for one-player use; I tried it and was unable to control the sphere.

A call to Arcadia provided the answers. Apparently, there's a misprint in the manual: player one should use joystick port 1. Also, when using the keyboard, you must simultaneously press O and A to aim left and P and A to aim right.

Roadwars is a fast-moving game—perhaps too fast. Objects come at you so quickly that it's hard to understand why you can sometimes move up in level and other times get blown off the road. Success seems to owe as much to blind luck as to player skill. Rather than a sense of being in control of the battlesphere, the feeling is more akin to shooting a gun with your eyes closed, then opening them to see if you've hit anything.

There is background music, but it's repetitive and soon becomes annoying. Roadwars would be far more pleasant if the music could be turned off. The graphic screens are colorful, but look much alike throughout the different levels of play.

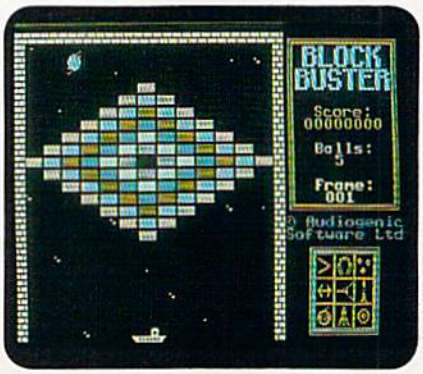
Those with panther-like reflexes will probably enjoy Roadwars. For those of us who move more like alley cats, the game soon becomes frustrating. Fans of shoot-'em-up arcade games should add this entry to their collection. All others are advised to give Roadwars a pass. *(Arcadia; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$29.99.)*

—MICHAEL CAVANAUGH
LEVITTOWN, PA

BLOCKBUSTER . . . . . B

Follow the Bouncing Ball; Make It Break Through That Brick-Filled Wall

For over a decade, players of electronic games have happily followed the bouncing ball. In the 1970s, there



This is the first level in Blockbuster—how fast you can get to the 80th?

was the original video tennis game, Pong. The engrossing wall-wrecker, Breakout, came next. Now Blockbuster continues the tradition.

The program's packaging boasts that it "takes up where the arcade classic Breakout left off!" Indeed, Blockbuster not only shares its predecessor's goal—to earn the maximum number of points by demolishing bricks—but also adds some interesting new twists to an old scenario.

You begin the game with five balls and acquire extras for high point totals. A prerequisite for a big score is skill at keeping the balls in play by hitting them upward with a movable bar. The game ends when the last ball gets past the bar to the screen's bottom.

In each of 80 levels, there's a unique pattern of bricks to destroy. After every ten screens are conquered, a password appears that lets a player skip those levels in future sessions.

Eight different types of aliens roam the screen in Blockbuster. Besides diverting a player's attention, they frequently deflect balls and even drop stun bombs that can paralyze the bar.

Some bricks contain valuable tokens, which you can "catch" and eventually use to buy nine different "weapons." For example, there are options that slow down balls and enlarge the bar. More exotic items for purchase include torches that light up invisible bricks, smart bombs that destroy aliens and block-blasting lasers.

Another game feature is a bonus for destroying certain bricks in a particular order. There's also a user-friendly Construction mode for the creation of 48 personalized screens.

Although all players will appreciate the fine graphics, sound and animation, some may encounter trouble with the program's control system. While Pong and Breakout had paddle controllers, the Mindscape game requires you to use either a joystick or the keyboard. Some people may find either option awkward and imprecise in a contest that requires only horizontal movement. A pre-purchase tryout is definitely recommended.

Yet, despite this possible difficulty, many will enjoy Blockbuster. It retains the essence of Breakout's addictive gameplay, but also has some intriguing new tactical options. The end result is a program that can make the old bouncing ball even more fascinating to follow. *(Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062. C-64/$29.95.)*

—WALT LATOCHA
OAK PARK, IL

BECKERBASIC C

Attention Programmers: A New GEOS Add-On Has Made the Scene

BeckerBasic is advertised as a way for C-64 programmers to easily write GEOS applications in Basic. It includes utilities for creating GEOS menus, dialog boxes and windows.

Abacus' system expands the 64's Basic 2.0 by offering 273 new Basic commands, and machine language programmers can also create their own. Commands are numbered and listed by category: sound, high-resolution graphics, sprites, disk commands, memory access, program development and input/output.

Here are some command examples and their definitions. Hrdsave and Hrdload save and load hi-res screens, and Pdfkey, like the C-128's Key command, assigns up to 10 characters for each function key. Screen commands include Scprint At, which allows for printing at any location on the screen, and Scetv, which reads data from the screen and places it into a string variable.

In addition, BeckerBasic contains commands like Mbprior for setting priorities, and Mbchecks for detecting collisions. A simple sprite editor is also included.

The program has commands for creating sound and music. Using Sdenvelope, different envelopes can be selected for each of the SID chip's voices. Filtering and ring modulation effects can be accomplished with Sdfilter and Sdringmodon.

All the Basic 2.0 commands are available in BeckerBasic, but some use different syntax. For example, Goto and Gosub can accept calculated expressions as well as labels, making it possible to use statements like Gosub "MYSUBROUTINE", OR GOTO(LINE*5) + 2. The Restore command can use labels and expressions to restore any previously read Data statement.

Many "plain vanilla" Basic programs need doctoring before they'll run with BeckerBasic. For example, the If... Then structure requires a new statement, Endif, which in turn makes possible a new BeckerBasic command called Else. A Basic 2.0 program like

```
10 IF A = 10 THEN GOTO 40
20 A = 20
30 GOTO 50
40 PRINT "A is equal to 10":END
50 PRINT "A is not equal to 10":END
```

can be written in BeckerBasic as

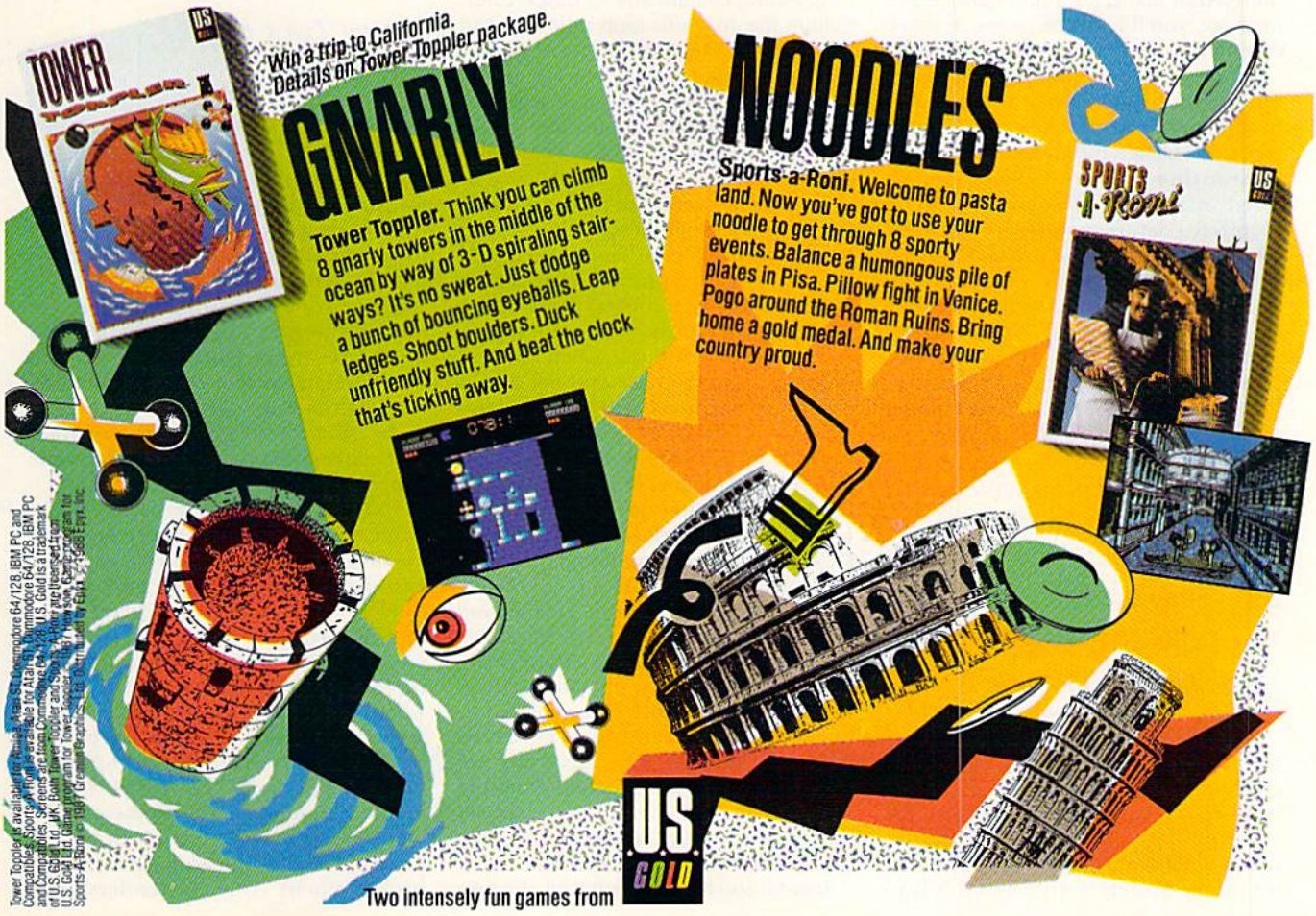
```
10 IF A = 10 THEN GOTO "EQUAL"
20 ELSE A = 20:GOTO "NOTEQUAL"
30 ENDIF
40 "EQUAL":PRINT "A is equal to 10":END
50 "NOTEQUAL":PRINT "A is not equal to
   10":END
```

Your icon options in Abacus' BeckerBasic.

Basic programs that include machine language subroutines or Peek, Poke and SYS commands probably require many changes to avoid memory conflicts with BeckerBasic.

BeckerBasic provides three different interpreters (systems)—Input, Testing and Run-Only. The Input System resembles the C-64's screen editor, and can be used to create programs that can be run from the Testing System. You can toggle between the two systems without losing a program. Once your program is debugged, it can be run from the Run-Only System, which can be distributed along with your programs.

BeckerBasic's touted access to GEOS routines may fall short as far as Basic programmers are concerned, because only a few GEOS features are supported. There doesn't appear to be any simple way to access GEOS icons, the disk turbo routines or alternate fonts. Another problem is that text entered in Basic must be converted to true ASCII, which GEOS uses, before it can be displayed. ►


Win a trip to California.
Details on Tower Toppler package.
TOWER TOPPLER
GNARLY
Tower Toppler. Think you can climb 8 gnarly towers in the middle of the ocean by way of 3-D spiraling stairways? It's no sweat. Just dodge a bunch of bouncing eyeballs. Leap ledges. Shoot boulders. Duck unfriendly stuff. And beat the clock that's ticking away.
NOODLES
Sports-a-Roni. Welcome to pasta land. Now you've got to use your noodle to get through 8 sporty events. Balance a humongous pile of plates in Pisa. Pillow fight in Venice. Pogo around the Roman Ruins. Bring home a gold medal. And make your country proud.
SPORTS-A-RONI
US GOLD
Two intensely fun games from

BeckerBasic supports most GEOS graphics routines with commands to draw points, lines and boxes. (Boxes can be drawn using the GEOS fill patterns.) Unfortunately, GEOS Photo Scraps can't be loaded into BeckerBasic.

While BeckerBasic applications can resemble GEOS applications, they are still Basic programs and run much more slowly. No provisions exist for selecting files from dialog boxes, or for using GEOS printer or input drivers. Furthermore, each GEOS menu and dialog box requires the creation of a separate file, which means that a program consisting of one menu and two dialog boxes would require five files.

Minor but annoying problems with the menu and dialog box utilities make it difficult to exit without saving a file to disk, even if you don't want to save your work. Because returning to the deskTop from BeckerBasic is unpredictable, the best way back into GEOS is through rebooting.

BeckerBasic's documentation varies from good to unclear. At times, it can even be insulting, as illustrated by the statement, "The BeckerBasic system will help you learn structured programming. After about the 15th or 20th error message, you'll learn to be much more careful in your program development."

These problems and complaints aside, BeckerBasic excels at structured programming with commands like Select, Case, Other and Repeat, and Until. Subroutine-like procedures can be saved as separate files and loaded as required. Useful examples are provided on the disk and in the manual.

BeckerBasic is useful for creating short, simple GEOS programs, and as an introduction to structured programming commands. For the most part, though, serious GEOS applications still have to be written with an assembler. *(Abacus, 5370 52nd St. SE, Grand Rapids, MI 49508. C-64/$49.95.)*

—RANDY WINCHESTER
CAMBRIDGE, MA

SKY TRAVEL ..... A

Star Light, Star Bright, First Star I See Tonight...

Sky Travel is a superb observational astronomy program. Bringing a planetarium to your fingertips, you can use it to re-create celestial events as far back as 9999 BC, or look into the future up to 9999 AD. For example, you can set up the screen to see what the 1054 AD supernova looked like; check out how the sky appeared on the day you were born; or print out the star chart for your vacation destination, and take it with you for comparison to the real thing!

Sky Travel lets you observe the sky from any area on Earth.

The clearly written documentation includes plenty of photos and diagrams, and a glossary of astronomical terms. The appendices contain a list of longitude and latitude for cities around the world; tables of constellations, conversions, eclipses and comets; and technical information like magnification ratios used in the program. There's also a list of supplementary reading arranged by age group, and a handy reference sheet of keyboard and optional joystick commands.

The general method of working with this software is to first display a Mercator map projection of the world, with the time zones indicated in relation to Greenwich Mean Time. Then you choose the geographical location, date and time for your observation of the sky. The program automatically adjusts for a Julian or Gregorian calendar date. After this, you can have outlines drawn of the constellations, see the names and symbols of stars and planets and the symbols for galaxies in deep space.

The program next draws the star map for you, including an arrow pointing toward the north celestial pole, but your sky can be displayed as though you were facing in any direction you choose. In addition, if you're interested in locating a certain celestial object, you can have it placed in the center of the screen, and if you see objects you'd like to identify, pressing one key gives you information about them. If you'd like to quiz yourself, you can have the program erase the names and symbols from the screen. The clock rate can even be set to watch the stars move across your screen with the passage of time.

In addition to a short tutorial, the program provides over 30 examples to get you acquainted with how the software works. One of the features I especially like is that the color of the screen display changes with the time of day: during the day, stars are shown against a blue sky, and as twilight approaches, the sky turns purple, then gray and finally black. This way, you can watch the stars and planets during sunrise and sunset. I also like the fact that I can track and observe things like solar and lunar eclipses, phases of the moon and planetary occultations.

There are a few typos in the manual, but they are relatively minor and easily amended. I recommend this program for anyone interested in astronomy. Children age 12 and older can grow with the program, and adults can delve into the subject in detail. Sky Travel is an outstanding and versatile piece of software. *(Microillusions; distributed by Mediagenic, 3885 Bohannon Drive, Menlo Park, CA 94025. C-64/$49.95.)*

—EDITH CHASEN
WOODHAVEN, NY

TOBRUK ..... B

A War Game With A New Twist for Arcade Addicts

Most computer war games are designed for a certain kind of person: not necessarily someone with blood lust or lifetime membership in a rifle club, but a gamester who enjoys sitting for hours and weighing options before making a decision.

There's nothing wrong with that, but there are some of us who act first and think later. We're generally bored with war simulations that require spending a lot of time pondering a move, only to be rewarded with a new situation that makes you go through the same process all over again.

So I was pleasantly surprised to discover a war simulation for people like me. Tobruk is billed as a "tank simulation/war strategy game," and, thankfully for this reviewer, it lives up to that billing.

The game transports Commodore owners back to late spring of 1942, when Allied and Axis armies waged ferocious battles over a 150-by-500-mile strip of hot, dusty, North African desert. Hitler's Afrika Korps, led by Major General Erwin Rommel, was bent on capturing the strategically important Mediterranean port city of Tobruk from its Allied defenders. This

It's the Axis commander's turn to make a move in Tobruk.

game thrusts you into that battle.

You can match wits with the computer or a human foe. However, there's no way to play the Allied commander unless you have a human opponent; choosing to play against the computer automatically puts you in command of the Axis forces. Even with this limitation, Tobruk is a completely absorbing and entertaining war simulation.

As a strategy game, it addresses nearly all the important elements of a military battle without bogging itself down in so much detail that it risks becoming boring to someone with limited patience. Game play is so simple and logical that each move can be made in seconds. Although players have control over nearly all the tactical decisions, the timing of various functions is calculated and controlled by the program.

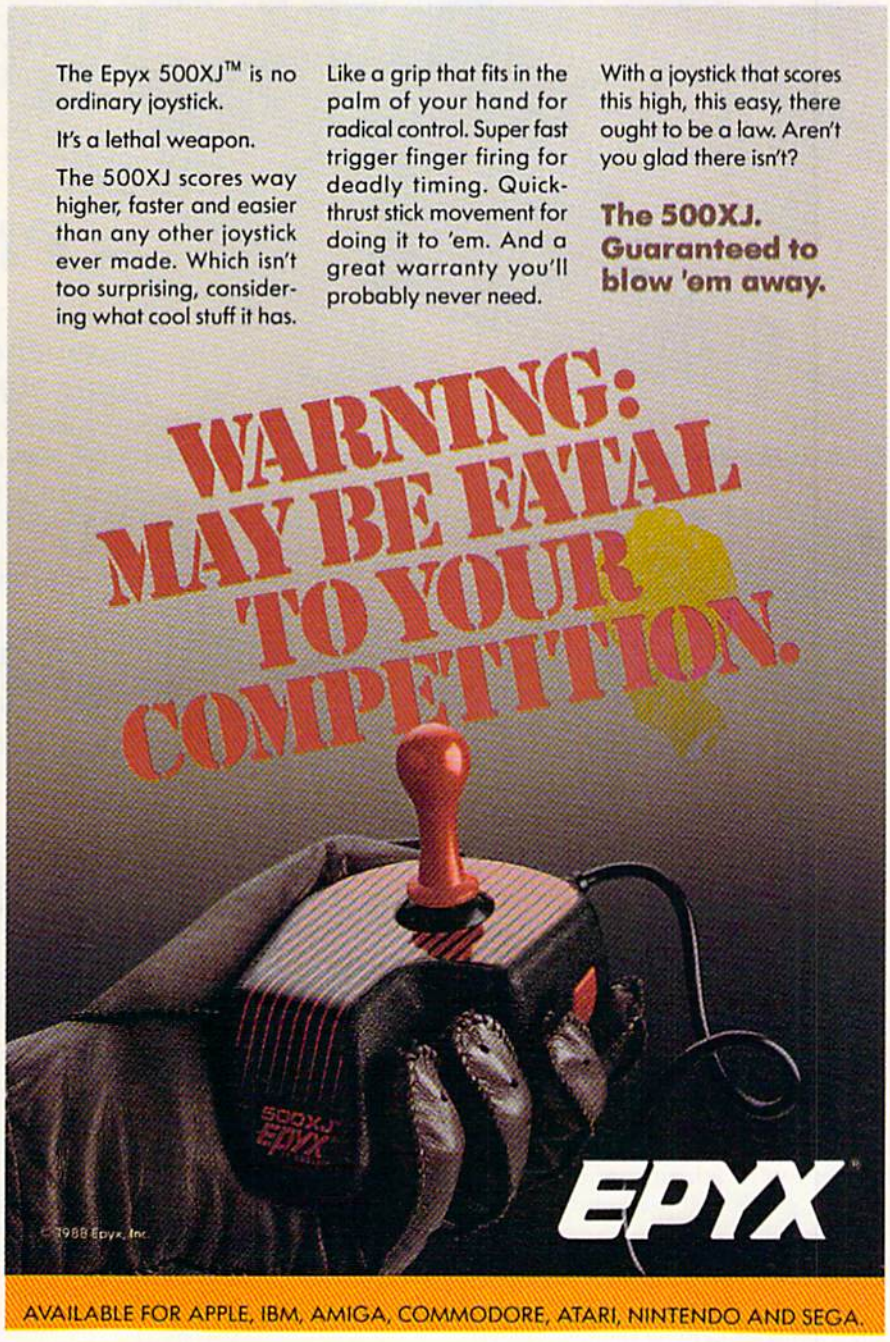
Play revolves around a map of the battle zone that depicts the location of all Axis and Allied military units, supply dumps, strongholds and fortifications. At the top of the screen is a message area that tells the day and time, military unit in action, what type of activity is taking place and when sides can call in reinforcements. The strength of any Allied or Axis unit is displayed in a small window that pops up whenever the cursor is placed over that unit. Because all functions are controlled by joystick, fire-button and space bar, it's simple to perform any action.

The software's arcade option is what separates Tobruk from most other war games. Selecting this option puts you inside one of the tanks, looking out its turret view slit. You can maneuver your tank and fire its machine gun or cannon. An information screen tells you the enemy's bearing and range, your gun elevation, the amount of damage you've absorbed and how much ammunition remains.

I found this part of Tobruk slightly more difficult to master and control than many arcade-only games. Response to joystick and keyboard input, as in the strategy part of the game, seemed a little balky. But this phase of Tobruk is not simply a shoot-'em-up, since strategy based on other factors determines the outcome of a battle more than quick reflexes and good eye-hand coordination.

That's not a criticism, since this program revolves primarily around strategy. The arcade-type tank simulation is an added bonus that provides variety in an otherwise fine strategic game. It seems that there are enough strategic options to keep happy those who favor mind-grinding simulations. But the arcade bonus and the game's easy-to-follow design also make it appealing to those of us who might not wish to exercise our brain cells too much. *(Datasoft; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$29.95.)*

—SCOTT WASSER
WILKES-BARRE, PA ■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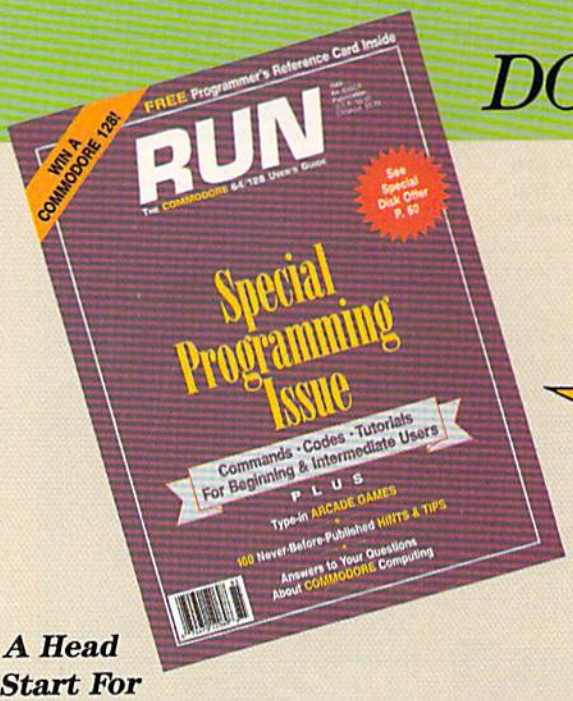
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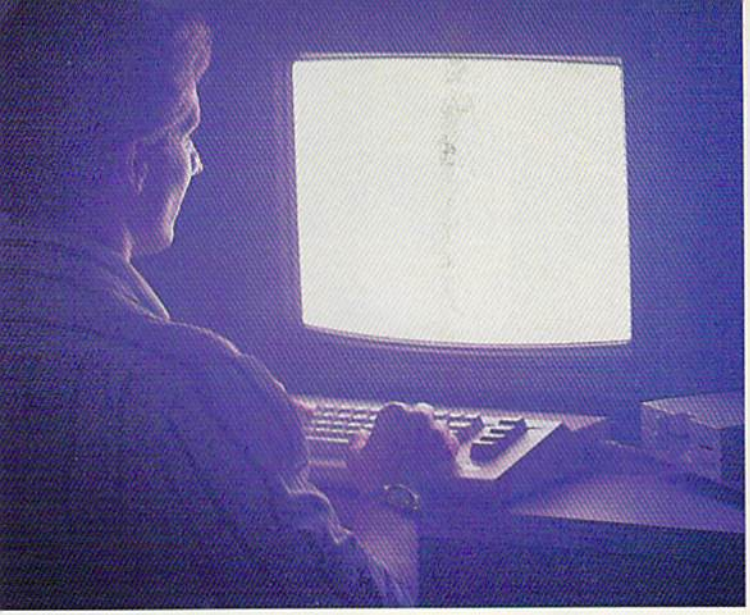

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COMING TO A SCREEN NEAR YOU!

Hollywood makes its mark on Commodore entertainment software this holiday season.

IT'S BEEN SAID that familiarity breeds contempt. That may well be true, but last June's Consumer Electronics Show revealed that familiarity can also mean big sales at the local software store. That's why many companies are focusing a large portion of their research and development effort on programs based on themes already familiar to the average consumer. Where better, then, to turn for grist for the software mill than the entertainment industries? Movies, television, sports and even popular books have all made their way onto the software shelves in recent months, and the trend shows no signs of slowing.

LIGHTS, CAMERA, LOADING. . .

Now, the idea of translating a hit movie into software isn't exactly new. In fact, Mediagenic recently released Aliens: The Computer Game again in its Solid Gold "oldies but goodies" line. What is surprising is the speed with which some movies make the transition from big screen to computer monitor.

Take Willow, for instance—the Lucasfilm game based on the movie of that name. Mindscape timed the release of some computer versions (but not Commodore) to coincide with the opening of the movie itself. The game is a fantasy adventure that closely follows the story line of the film. As Willow Ufgood, you must travel with Elora Dan through a magical but dangerous world. Your goal is to defeat the evil Queen Bavmorda, but to do so you must master seven arcade sequences based on action in the movie. Current versions use digitized stills from the movie along with hires computer graphics to increase the game's realism. Mindscape is planning a C-64 version, but no release date has yet been announced.

Indiana Jones and the Temple of Doom is another Mindscape game that started out on the big screen. In the role of Indiana, who's armed with only a bullwhip, you must battle against giant cobras, bats, Thugee guards and the evil High Priest, Mola Ram. The game features three levels, each based on a scene from the original. In the Caverns, you free imprisoned children by whipping the locks off of their cages, and in the Mine Tunnels you maneuver your mine car down the tracks while avoiding Thugee guards and breaks ►

By BOB GUERRA

ILLUSTRATED BY BETH KROMMES

PHOTOGRAPH COURTESY OF BETTMAN ARCHIVES

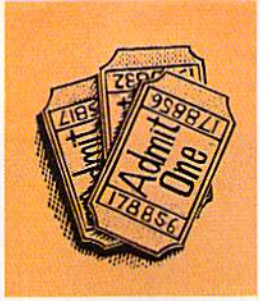
in the rails. Success brings you to the Temple of Doom, where you must recover the Sankara Stone. Make it through these levels three times to recover three stones, and you win the game.

Among other action-packed movies that have found their way onto software shelves in recent months are Platoon and Predator. Based on the Oscar-winning movie, Data East's Platoon is a simulation set in the Vietnam War. Your goal is to maintain the morale, health and ammunition supply of your five-man platoon while completing six dangerous missions. These range from groping through the jungle while avoiding booby traps and snipers to searching the extensive North Vietnamese tunnel network for supplies.

Mediagenic's Predator puts you in command of an elite military rescue team. Like Arnold Schwarzenegger in the film, you must lead your men through the South American jungles to save United States diplomats from terrorists. Along the way, you find assorted weaponry, including machine guns, flame throwers and hand grenades, that you can use against the enemy forces.

Although action and adventure films translate easily to the computer game format, don't think that all "showbiz software" features weapon-toting warriors who blast their way to victory. Hi-Tech Expressions has recently released two games in its Walt Disney software line, aimed at young gamers. Matterhorn Screamer is a climbing contest in which you maneuver Goofy up icy mountain cliffs while collecting flags and avoiding mountain goats, abominable snowmen, falling icicles and speeding bobsleds.

The second Disney title, The Chase on Tom Sawyer's Island, is a maze game in which you help Tom collect berries while eluding Aunt Polly, Injun Joe and a bear. Hi-Tech recommends both of these games for ages eight and up. Unfortunately, while the difficulty level definitely calls for this age group, the themes probably appeal more to younger children.



Don't think that all showbiz software features weapon-toting warriors.

THE THRILL OF VICTORY. . .

Of course, Hollywood isn't the only source of names that can translate into higher sales. Since it's practically become an American tradition for our favorite sports heroes to endorse everything from breakfast cereal to athletic shoes, software companies such as Gamestar and Melbourne House have decided that it's only fitting (and profitable) to enlist athletes in the design and marketing of sports simulations.

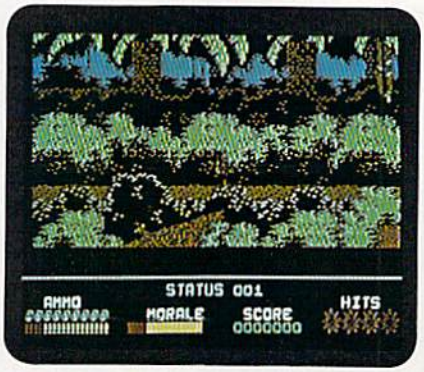
One of the first and most successful of these collaborations resulted in the classic Electronic Arts basketball simulation, One on One—the game that pits the acrobatic slam dunks of former basketball great Julius Erving against the deadly accurate jump shots of Larry Bird. Since the release of One on One in 1983, Electronic Arts has teamed up with Earl Weaver to produce the highly acclaimed Earl Weaver Baseball for the Amiga, and, earlier this year, it signed agreements with former football player and coach of the Oakland Raiders, John Madden, and with Chicago Bulls' guard Michael Jordan.

More recently, the manager and long-time star of the Cincinnati Reds, Pete Rose, has joined forces with Gamestar (now a Mediagenic line) to create Pete Rose Pennant Fever. While this baseball simulation, with TV-style graphics, lets you participate in the game as a player, it also involves you in managerial decisions, such as calling for plays and making player substitutions. What really sets Pete Rose Pennant Fever apart, however, is placing you in the general manager's seat. In this role, you must take an expansion team all the way to the pennant by acquiring the right players and controlling the team's finances, including player salaries.

Another new sports simulation that carries a celebrity endorsement is John Elway's Quarterback, from the Melbourne House division of Mastertronics. Because this game is described as an accurate translation of the Quarterback arcade game, it's doubtful that the Broncos' star had much to do with its design. However, Elway, who's reportedly a big fan of the coin-op, attests to the similarity between the computer game and the original.

Another football game you'll want to watch for this fall is Cinemaware's TV Sports: Football. While this simulation carries no celebrity endorsement, it does promise to bring all the ex-

Mindscape's Indiana Jones has only a whip in his battle against bad guys, evil obstacles and deadly creatures.



Your mission is to keep your morale high and your health and ammo up in the jungle of Data East's Platoon.

Larry, Moe and Curly are up to their old zany shenanigans in The Three Stooges game from Cinemaware.

citement of televised football to your C-64. In addition to action on the field, it will include a pregame show, shots of the coach, cheerleaders and fans as they react to plays, and even a marching band during halftime.

SPEAKING OF TELEVISION. . .

Over the last year or so, television has been a fruitful source of ideas and themes for software. First Row Software, for example, is developing games based on two classic TV shows: The Honeymooners and Rod Serling's The Twilight Zone. Although First Row has not yet announced a C-64 version of The Honeymooners, Twilight Zone for the C-64 is scheduled for release and shipment in November. Action in this graphics adventure begins with the familiar but quickly turns to the bizarre.

First Row is also working on a C-64 game called Prime Time that should be available this fall. In this simulation, you'll play the role of a network executive who must keep the company's ratings high by buying popular shows and canceling losers.

One of the best TV-related games to come along is Cinemaware's "interactive movie," The Three Stooges. From the surprising title screen to the superb digitized sound sprinkled throughout the game, this program will bring back great memories. If you laughed at Moe, Larry and Curly tossing pies at stuffy dinner guests or racing through a crowded hospital while being paged "Dr. Howard, Dr. Fine, Dr. Howard," then you're bound to enjoy The Three Stooges.

Childrens' shows and cartoons have also spawned a number of computer games. Hi-Tech Expressions has packaged together three former CBS software titles—Astro-Grover, Ernie's Magic Shapes and Big Bird's Special Delivery—as Learning Library Volume One. Preschoolers might also enjoy the Box Office adventure game based on the NBC show ALF. Box Office has recently released an action game called Captain Power and the Soldiers of the Future, based on the popular sci-fi series.

Surprisingly, not many cartoons have inspired computer games. One that has is Warner Brothers' Road Runner, which first appeared as an arcade coin-op. As you might expect, this is a chase game featuring Wile E. Coyote in hot pursuit of the elusive Road Runner. True to the original cartoons, the game includes several contraptions from the Acme company, such as pogo sticks and jet booster rockets, that the coyote can use to catch his bird.

Surprisingly, not many cartoons have inspired computer games.

More cartoon spin-offs are in the offing. Microillusions (distributed by Mediagenic) has signed a licensing agreement with Hanna-Barbera to bring some of their animated characters to the computer screen. Future releases could feature characters from cartoon classics like The Flintstones, The Jetsons, Scooby-Doo and Johnny Quest.

TV game shows have also found their way onto disk with the help of companies like ShareData and Box Office. ShareData, in bringing Jeopardy!, Family Feud, and, everyone's favorite, Wheel of Fortune, to the home computer screen, was one of the first firms to capitalize on the popularity of game shows. Their latest hit, Classic Concentration, is an excellent adaptation of the television show that's recently made a comeback after almost 20 years. While you play, the scene shifts from the puzzle board (when you're making selections) to shots of both contestants when one makes a match. As on the show, the prizes (ranging from patio furniture to European vacations) are listed behind the contestants. The big payoff is a chance to actually try for that brand new car!

High Rollers and $100,000 Pyramid are Box Office's contributions to the genre of game-show software, and like ShareData's titles, both are available for less than $15. Also in this price range is Hi-Tech Expressions' Win, Lose or Draw, based on the game show of the same name.

GO DIRECTLY TO JAIL

In a similar trend, popular board games are being adapted to the home-computer format. Besides the traditional chess, some board games that have made the transition include the Leisure Genius (distributed by Electronic Arts) titles Scrabble, Monopoly, Risk and Scruples, as well ►

"Road Runner, that Coyote's after you; Road Runner, if he catches you, you're through!" Mindscape revives an oldie.

You must weigh many factors when your Scruples are put to the test in the game from Electronic Arts.

Buying, selling, renting, trading: now Electronic Arts has that old board-game favorite, Monopoly, on screen.

No Quarters Required

By WALT LATOCHA

AS HEAVY METAL IS TO MUSIC, so arcade machines are to gaming, and arcade games were another prominent theme at the most recent Consumer Electronics Show. From their alluring graphics and sound to their nonstop action, coin-operated contests are designed to generate excitement. If successful, they produce an adrenaline "high" that players want to experience again and again.

It's appropriate that coin-op hits have so often been adapted to the C-64, a machine noted for its sound and graphics and well-suited to game play. From Space Invaders to Pac-Man to Gauntlet, nearly every popular arcade game has ended up in a Commodore version. The Nintendo's recent success, which is largely due to conversions of coin-operated titles like Super Mario Bros., has accelerated this trend.

Transferring an arcade contest to the home market would seem an easy task, but dissimilarities between the two environments can turn a white-hot, coin-op game into a lukewarm computer clone. One of these differences lies in the hardware used to control the game. As the player of a coin-operated machine, you usually manipulate large controls—including such exotic devices as crossbows and motorcycle handlebars—that may be custom designed for the particular program. Producing an effective C-64 equivalent can be difficult.

CONTROLLING THE PROBLEMS

Taito's programmers did an extraordinary job of handling the control problem in their conversion of Arkanoid, a game in which you destroy walls of blocks and earn special powers by hitting energy spheres with a spacecraft. The most important control in the coin-operated edition of Arkanoid is a round dial, which can move the ship rapidly and with great precision. Using this dial, a skilled player can succeed, even when there are three energy spheres on the screen at once. While another company might have supported only a joystick in a C-64 version of this program, Taito offers a more accurate Commodore paddle controller and a mouse as options. Such attention to the player's needs adds immeasurably to the excellence of the game.

Fortunately, software developers have found ways to minimize another important difference between coin-operated and home games: their level of sensory impact. In the past, the C-64 could produce only a pale imitation of the effect arcade machines have on the eyes and ears. Recently, however, programming advances have made coin-op translations, such as Konami's Contra, almost as visually and aurally compelling as the originals.

"Shoot everything in sight," states Contra's manual in its advice on surviving the game's "give-'em-no-mercy" combat. The soldier you control is under continuous attack by both hordes of interplanetary jungle fighters and sophisticated electronic devices. This constant action, to be expected from a top-level "shoot-and-run" game, plus Contra's rich and vivid graphics, fluid animation and exotic combat sounds, create an exciting atmosphere of desperate warfare.

Some options of arcade games have stimulated software developers to enrich the home market with the same possibilities. For instance, Karate Champ, an older adaptation from Data East, pits two players against each other in a martial arts tournament. Such multiplayer competition, common in arcade parlors, has been rare on personal computers.

VIVE LES DIFFERENCES!

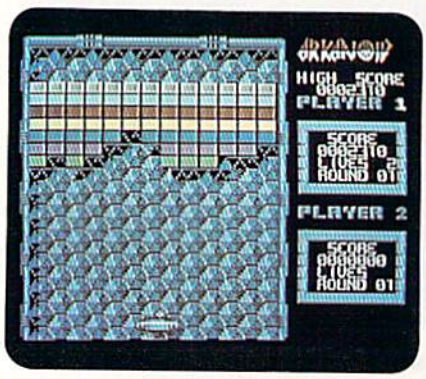
A few differences between the arcade and computer gaming environments have actually allowed improvements in the transfer to software. In software versions, for example, it's unnecessary to carry over the usual arcade practice of starting each new game at the first screen. While Data East takes this approach in Commando for the C-64, the same company lets a player of the Commodore version of Kid Niki begin a new game at the highest level reached during the current session. This arrangement minimizes frustration and fits the fantasy-quest nature of Niki.

Programmers must also decide whether to give home players more or less instruction and background information than would be available in arcades, and they must take into account how the shape of a particular coin-operated display will appear on a standard home TV or monitor. The success of a conversion can even depend on whether a pause button—shunned in arcades, but common in home entertainment software—is included.

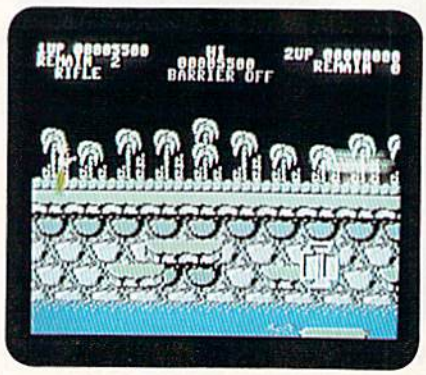
While some programmers have failed to give adequate thought to differences between the two gaming environments, others are using their ingenuity to produce splendid adaptations. While not exact duplicates of the originals, these games are, in their own way, just as good or even better.

Software manufacturers plan on giving Commodore fast-action addicts still more programs to satisfy their craving. Data East alone will have more than a dozen coin-op conversions on the market by the beginning of 1989. If you investigate how well each product bridges the gap between arcade and home, you should have lots of fun "walking on the wild side" with your C-64. R

Walt Latocha is a free-lance writer with special interests in computers, VCRs and electronic games.

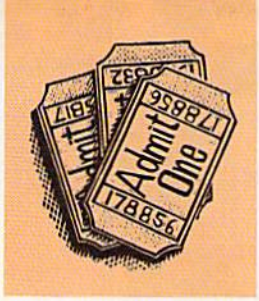


Use joystick, mouse or paddle for spaceship control in Taito's Arkanoid.



It's the "shoot 'til you drop" theory in Konami's Contra.

Try the martial arts, multiplayer mix in Data East's Karate Champ.



as Club Backgammon, a terrific simulation from California Dreams. Perhaps the greatest advantage of these computerized versions of traditional board games is that your pawns, chance cards, letter tiles or play money won't get scattered all over the floor if someone bumps your monitor.

Another advantage to playing traditional board games on your C-64 is the chance to save games in progress. This option is particularly useful when playing, say, standard Monopoly, because of the long time needed to complete a game. The C-64 version of Monopoly also has a built-in timer, so you can set a limit at the outset of play; when the time has expired, the computer automatically calculates the combined value of everyone's cash and real estate holdings and declares a winner.

Similarly, Scrabble lets you set a time limit on each player's moves, so someone with an X, two Qs, three Os and a Z doesn't spend half the evening staring at his or her rack. This game also has a built-in dictionary and challenges a player when presented with a word it doesn't recognize. Other features include a hint option, opportunity to "juggle" the letters in your rack and a choice between viewing only one rack at a time or all the players' racks continuously.

Movies, sports, television, board games—wherever software developers search for ideas, the finished program that you load into your C-64 must provide unique challenges, entertaining play, and first-rate sound and graphics. No matter how popular the source, no game will enjoy long-term success just because it's based on a hit movie or endorsed by a famous athlete. Fortunately, software developers are learning this lesson, and most of the showbiz software you'll find at your local computer store lives up to the familiar words and pictures on the box. ■

Bob Guerra, an editor working in the cardiac unit of Massachusetts General Hospital, has written many software reviews for RUN.

Table 1. Distributors and prices.

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ALF; Captain Power and the Soldiers of the Future; High Rollers; $100,000 Pyramid; (all $14.99)

Cinemaware
4165 Thousand Oaks Blvd.
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Data East
470 Needles Drive
San Jose, CA 95112
Platoon, ($29.95); Karate Champ (now bundled with Kung Fu Master for $14.95); Commando ($14.95); Kid Niki ($29.95)

Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
Scrabble ($34.95); Monopoly ($39.95); Risk ($39.95); Scruples ($39.95)

California Dreams
780 Montague Expressway, Suite 403
San Jose, CA 95131
Club Backgammon ($29.95)

First Row Software
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King of Prussia, PA 19406
The Twilight Zone ($39.95); Prime Time ($29.95)

Hi-Tech Expressions
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Plantation, FL 33313
Matterhorn Screamer ($10.99); The Chase on Tom Sawyer's Island ($10.99); Learning Library Volume One (Astro-Grover; Ernie's Magic Shapes; Big Bird's Special Delivery) ($24.99); Win, Lose or Draw ($12.99)

Konami
815 Mittel Drive
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Contra ($29.95)

Mediagenic
3885 Bohannon Drive
Menlo Park, CA 94025
Aliens: The Computer Game ($14.95); Predator ($29.95); Pete Rose Pennant Fever ($34.95)

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Costa Mesa, CA 92627
Quarterback ($29.95)

Mindscape
3444 Dundee Rd.
Northbrook, IL 60062
Willow (price not available at press time); Indiana Jones and the Temple of Doom ($34.95); Road Runner ($34.95)

ShareData, Inc.
7400 W. Detroit St., Suite 170
Chandler, AZ 85226
Jeopardy! ($9.99); Family Feud ($9.99); Wheel of Fortune ($9.99); Classic Concentration ($14.99)

Taito Software
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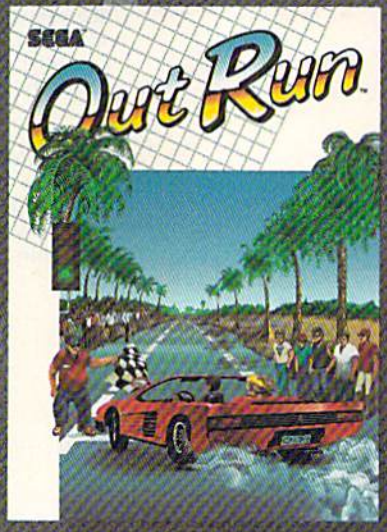

Hot car. Hot music. Hot scenery—beaches, cities, snowy mountains, deserts and the blonde next to you will tempt you to take your eyes off the road. At close to 300 KPH, our advice to you is a 4-letter word. DON'T.

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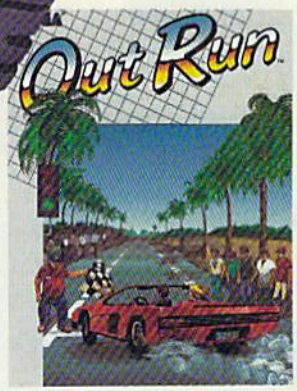

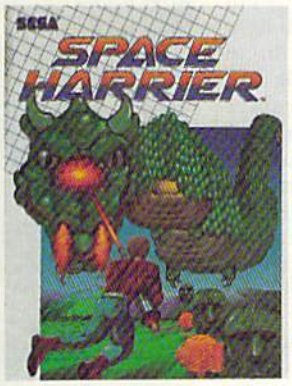

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Hail to the Chief

This presidential trivia game tests your knowledge of presidents from Washington to Reagan.

By LOU WALLACE

Everyone likes trivia. We talk about it at parties, read about it in the papers and watch it on TV. We also play with it, in games such as Trivial Pursuit. Well, now you can develop your own content for a trivia game to play on your C-64!

This program is a general purpose trivia game that comes with questions on one category—the U.S. presidents—and can be expanded to include other subjects. It's a gambling game as well, where you bet money based on your knowledge.

There are three program listings involved. Listing 1, the Trivia game itself, is written in normal C-64 Basic. Using *RUN*'s Checksum program, type it in and save it with the name TRIVIA.

Listing 2 is a database of facts about the presidents and contains 101 questions. It, too, is a Basic program, but in the form of a hexadecimal data list. We're publishing it that way so you won't find out what the questions and answers are while you type it in, thus making the game a lot more fun when you play. After typing in Listing 2 with the help of the Checksum program, save it to disk with the name LIST2 and then run it. Just don't name Listing 2 PRESTRIVIA, because it writes a sequential file by that name to your disk. PRESTRIVIA is the actual database of questions.

Finally, type in the short program called Panels found elsewhere in this magazine. It contains machine language routines needed by Trivia.

Playing the Game

Once you've typed in all the programs and created the PRESTRIVIA file, you can load and run Trivia. There's a momentary pause while the program reads in the PRESTRIVIA data; then the game screen appears.

The play of each game consists of answering ten questions about the presidents, or whatever subject you make up a database for, and to win money in the process. You start with $25 and may wager one-fourth, one-half or all of your money on each question. (All amounts are rounded down to even dollars.) Select the amount you want to bet by using the cursor keys to move the selector bar. Then press either F1, F3, F5 or F7 to choose the president you think the question refers to. If you're right, your treasury increases; if not, the correct answer is displayed and you lose what you bet.

Each winning bet returns the amount you wagered times the number of the question you're on. For example, if you're on question 1 and bet half your $25, you win $12, for a total of $37. If you're on question 2, have $50 and bet half, you win $50 ($25 × 2). At question 10, you stand to win ten times the amount you bet, whereas you can lose no more than the amount of your bet. If you dared to bet *all* you had on each of the ten questions and won each time, you'd end up with more than $997,000,000!

The Presidential Trivia File

The datafile for the presidential trivia quiz is based mostly on a book entitled *Facts About the Presidents*, written by Joseph Kane and published by Pocket Books. The file covers almost all the presidents, and, since there are 101 questions, some presidents are associated with more than one question. Even after creating the database, when I first played Trivia, I often didn't remember an answer and, as a result, lost all my money. So, do like I do now, and don't bet everything you have—unless you're really sure!

Creating Your Own Databases

As I mentioned, you can make up your own trivia files for use with this game. All you need is a word processor (or text ed- ►

A peaceful morning is ripped by the staccato thunder of an enemy machine gun. In the distance, shrouded by the morning mists, you catch fitful glimpses of enemy activity as you shoulder your weapon and begin another assault. Another dive into the unknown, where death waits to harvest the unwary, the unlucky and the damned.

With experience and skill your forces penetrate the dangerously silent village. Moving forward, nerves on fire with tension while your body soaks up adrenalin like a sponge, you await contact. Soon you find the enemy, the dance has begun. Some Joe screams INCOMING, dives for cover and you are

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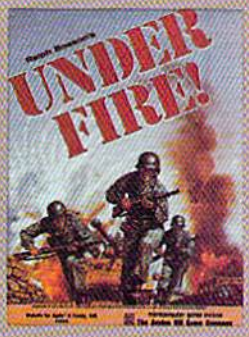

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itor) that saves its files in sequential form. I used RUN Script, but others, such as Easy Script, will do fine. The datafile is easy to set up, but it's important to follow the guidelines exactly.

First and foremost, everything must be in *lowercase*! Next, the first line must contain the name of the database, which can be up to 14 characters long. If it's longer, the extra will be ignored. For the built-in quiz, I called the database "presidential."

On the second line, place the number of possible answers to each question, with a minimum of four. In the presidential quiz, the number is 40—the number of presidents. Then follow with the answers, one per line.

After the answers, type in the number of questions—such as 101 for the presidential quiz. You must have at least ten questions, with each one containing no more than 36 characters. Finally, place each question on a line, followed by the number of the correct answer. Figure 1 shows a simple example of a Trivia database file.

After you've created the file, save it with the name of your choice. Then load the Trivia game, list line 55, change the filename PRESTRIVIA to the name of the file you've created and save your version of the game. When you run it, your new trivia database file will be used.

If you create a file that you think is really neat, send it to us here at *RUN*. If we like it, we might publish it in the future! R

Lou Wallace is RUN*'s technical manager, which is not a trivial pursuit.*

Figure 1. Sample Trivia database file.

```
run editors
7
dennis brisson
swain pratt
beth jala
harold bjornsen
lou wallace
tim walsh
peg lepage
10
run's editor-in-chief
1
run's managing editor
2
this is run's associate editor
4
this is run's copy editor
7
this is run's technical editor
6
this is run's technical manager
5
this is run's senior editor
3
writes the magic column
6
writes commodore clinic
5
this is one great guy!
5
```

Listing 1. Trivia program.

```
10 REM PRESIDENT TRIVIA-LOU WAL
   LACE                    :REM*171
20 REM LOAD"PANELS",8,1:REM*164
30 REM SYS 49152,X,Y FOR PRINT
   POSITION                :REM*1
40 REM SYS 49155,X,Y,W,H,C,S,M
   FOR PANEL               :REM*209
50 IF A=0 THEN A=1:LOAD"PANELS"
   ,8,1                    :REM*184
55 DN$="PRESTRIVIA":REM CHANGE
   THIS NAME TO USE OTHER DATAB
   ASES                    :REM*95
60 OPEN 8,8,8,DN$+",S,R"
                           :REM*210
65 INPUT#8,GN$:IF LEN(GN$)>14 T
   HEN GN$=LEFT$(GN$,14)
                           :REM*202
66 LL=LEN(GN$):LL=(14-LL)/2
                           :REM*181
67 IF LL<1 THEN 70         :REM*250
68 FOR I=1 TO LL:GN$=" "+GN$:NE
   XT                      :REM*225
70 INPUT#8,A$:NA=VAL(A$):DIM NA
   $(NA)                   :REM*137
80 FOR I=1 TO NA:INPUT#8,A$:NA$
   (I)=A$:NEXT             :REM*254
90 INPUT#8,A$:NQ=VAL(A$):DIM NQ
   $(NQ),CA(NQ)            :REM*174
100 FOR I=1 TO NQ:INPUT#8,A$:NQ
    $(I)=A$:INPUT#8,A$:CA(I)=VA
    L(A$):NEXT             :REM*47
110 CLOSE 8                :REM*127
120 POKE 53280,0:POKE 53281,0:P
    OKE 808,234            :REM*72
130 PO=49152:PA=49155:V=53248:S
    S=25:HS=10000:S=54272
                           :REM*239
140 F$(0)="F1":F$(1)="F3":F$(2)
    ="F5":F$(3)="F7"       :REM*202
150 FOR I=0 TO 191:READ A:POKE
    832+I,A:NEXT           :REM*31
160 FOR I=0 TO 62:READ A:POKE 7
    04+I,A:NEXT            :REM*91
170 POKE 2040,13:POKE 2041,14:P
    OKE 2042,15            :REM*95
180 POKE V+39,1:POKE V+40,1:POK
    E V+41,1               :REM*150
190 POKE V+1,214:POKE V+3,214:P
    OKE V+5,214            :REM*100
200 POKE V+0,76:POKE V+2,172:PO
    KE V+16,4:POKE V+4,12
                           :REM*242
210 POKE 2043,11:POKE V+7,224:P
    OKE V+6,64:POKE V+42,6:POKE
     V+37,1:POKEV+38,2     :REM*38
220 X(0)=64:X(1)=160:X(2)=255
                           :REM*46
230 VA(0)=.25:VA(1)=.5:VA(2)=1
                           :REM*67
240 POKE V+28,8:POKE V+29,8
                           :REM*114
250 REM SETUP SCREEN       :REM*127
260 PRINT"{SHFT CLR}":LL=RND(-T
    I)                     :REM*39
270 POKE 53265,(PEEK(53265)AND2
    39)                    :REM*24
280 SYS PA,0,0,12,5,1,1,0
                           :REM*121
290 SYS PA,28,0,12,5,1,1,0
                           :REM*59
300 SYS PA,12,0,16,5,7,2,0
                           :REM*179
310 SYS PA,0,5,40,13,3,2,0
                           :REM*105
320 SYS PA,0,18,40,6,10,0,0
                           :REM*32
330 SYS PA,1,19,38,4,14,4,0
                           :REM*245
340 SYS PA,4,20,8,2,5,4,0
                           :REM*11
350 SYS PA,16,20,8,2,5,4,0
                           :REM*240
360 SYS PA,28,20,8,2,5,4,0
                           :REM*213
370 SYS PO,2,1:PRINT "{CTRL 9}{
    CTRL 2}YOU HAVE"       :REM*209
380 SYS PO,29,1:PRINT "{CTRL 9}
    {CTRL 2}HIGH SCORE":REM*189
390 SYS PO,13,1:PRINT "{CTRL 9}
    {CTRL 8}RUN MAGAZINE'S"
                           :REM*149
400 SYS PO,13,2:PRINT "{CTRL 9}
    {CTRL 8}";GN$          :REM*8
410 SYS PO,14,3:PRINT "{CTRL 9}
    {CTRL 8}TRIVIA GAME!"
                           :REM*59
420 POKE V+21,15:GOSUB 2100
                           :REM*172
430 POKE 53265,(PEEK(53265)OR16
    )                      :REM*105
440 GOSUB 2000:QF=0        :REM*220
500 REM MAIN LOOP          :REM*204
510 Z=1:ZZ=10              :REM*58
520 GOSUB 3000             :REM*62
530 SYS PA,1,6,38,11,3,0,0
                           :REM*25
531 IF SS=>1 THEN 535      :REM*163
532 SYS PO,2,11:PRINT"{CTRL 9}{
    CTRL 4}YOU GOT NO MONEY...
    THE GAME IS OVER"      :REM*254
533 FOR TT=1 TO 3000:NEXT:GOTO
    800                    :REM*236
535 IF SS<HS THEN 800      :REM*92
540 SYS PO,3,11:PRINT"{CTRL 9}{
    CTRL 4}GREAT JOB! YOU HAVE
    THE HIGH SCORE!"       :REM*101
550 FOR TT=1 TO 5000:NEXT
                           :REM*227
800 REM EXIT ROUTINE       :REM*49
801 IF SS<=HS THEN 803     :REM*221
802 HS=SS:GOSUB 2100       :REM*148
803 SYS PA,1,6,38,11,3,0,0
```

```
                          :REM*119
8Ø4 SYS PO,2,11:PRINT"{CTRL 9}{
    CTRL 4}WOULD YOU LIKE TO PL
    AY AGAIN? (Y/N)"      :REM*46
8Ø5 GET KE$:IF KE$="" THEN 8Ø5
                          :REM*11Ø
8Ø6 IF KE$="N" THEN 82Ø:REM*138
8Ø7 IF KE$<>"Y" THEN 8Ø5:REM*51
8Ø8 SS=25:POKE V+21,Ø:GOTO 26Ø
                          :REM*51
82Ø POKE V+21,Ø:PRINT"{SHFT CLR
    }";:POKE 8Ø8,237:END
                          :REM*178
1ØØØ REM SPRITE DATA      :REM*14
1Ø1Ø DATA 24,Ø,6,24,3,14,56,6,3
     Ø,24,12,1Ø2          :REM*57
1Ø2Ø DATA 24,24,127,24,48,6,126
     ,96,6,Ø,Ø,Ø          :REM*1ØØ
1Ø3Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
     ,Ø                   :REM*1Ø3
1Ø4Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
     ,Ø                   :REM*93
1Ø5Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
     ,Ø                   :REM*75
1Ø6Ø DATA Ø,Ø,Ø,Ø,24,Ø,6Ø,24,3,
     1Ø2,56,6             :REM*2Ø8
1Ø7Ø DATA 6,24,12,12,24,24,48,2
     4,48,96,126,96       :REM*98
1Ø8Ø DATA 126,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
     ,Ø,Ø                 :REM*164
1Ø9Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
     ,Ø                   :REM*163
11ØØ DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
     ,Ø                   :REM*153
111Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,24,96
     ,96,6Ø               :REM*1ØØ
112Ø DATA 96,96,1Ø2,96,96,126,9
     6,96,1Ø2,96,96,1Ø2:REM*248
113Ø DATA 96,96,1Ø2,126,126,Ø,Ø
     ,Ø,Ø,Ø,Ø,Ø           :REM*112
114Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
     ,Ø                   :REM*241
115Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
     ,Ø                   :REM*239
116Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
     ,Ø                   :REM*229
117Ø REM CURSOR SPRITE    :REM*245
118Ø DATA 255,255,255,255,255,2
     55,85,85,85,85,85,85
                          :REM*132
119Ø DATA 17Ø,17Ø,17Ø,17Ø,17Ø,1
     7Ø,Ø,Ø,Ø,Ø,Ø,Ø       :REM*239
12ØØ DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
     ,Ø                   :REM*6Ø
121Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
     ,Ø                   :REM*42
122Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
     ,Ø                   :REM*32
123Ø DATA Ø,Ø,Ø           :REM*249
2ØØØ REM PRINT CURRENT SCORE
                          :REM*251
2Ø1Ø SYS PA,1,2,1Ø,2,1,Ø,Ø
                          :REM*194
2Ø2Ø D$=STR$(SS):LL=LEN(D$):D$=
     RIGHT$(D$,LL-1):D$="$"+D$:
     LL=LEN(D$)           :REM*69
2Ø3Ø XP=1+(INT((1Ø-LL)/2))
                          :REM*87
2Ø4Ø SYS PO,XP,3          :REM*38
2Ø5Ø PRINT "{CTRL 9}{CTRL 2}";D
     $                    :REM*63
2Ø6Ø RETURN               :REM*146
21ØØ REM PRINT HIGH SCORE
                          :REM*226
211Ø SYS PA,29,2,1Ø,2,1,Ø,Ø
                          :REM*46
212Ø D$=STR$(HS):LL=LEN(D$):D$=
     RIGHT$(D$,LL-1):D$="$"+D$:
     LL=LEN(D$)           :REM*1Ø3
213Ø XP=29+(INT((1Ø-LL)/2))
                          :REM*39
214Ø SYS PO,XP,3          :REM*138
215Ø PRINT "{CTRL 9}{CTRL 2}";D
     $                    :REM*155
216Ø RETURN               :REM*246
22ØØ REM GET CURSOR KEYS:REM*95
221Ø GET A$:IF A$="" THEN 221Ø
                          :REM*22Ø
222Ø IF A$=CHR$(133) THEN AN=Ø:
     GOTO 23ØØ            :REM*2Ø3
223Ø IF A$=CHR$(134) THEN AN=1:
     GOTO 23ØØ            :REM*233
224Ø IF A$=CHR$(135) THEN AN=2:
     GOTO 23ØØ            :REM*135
```

Continued on p. 84.

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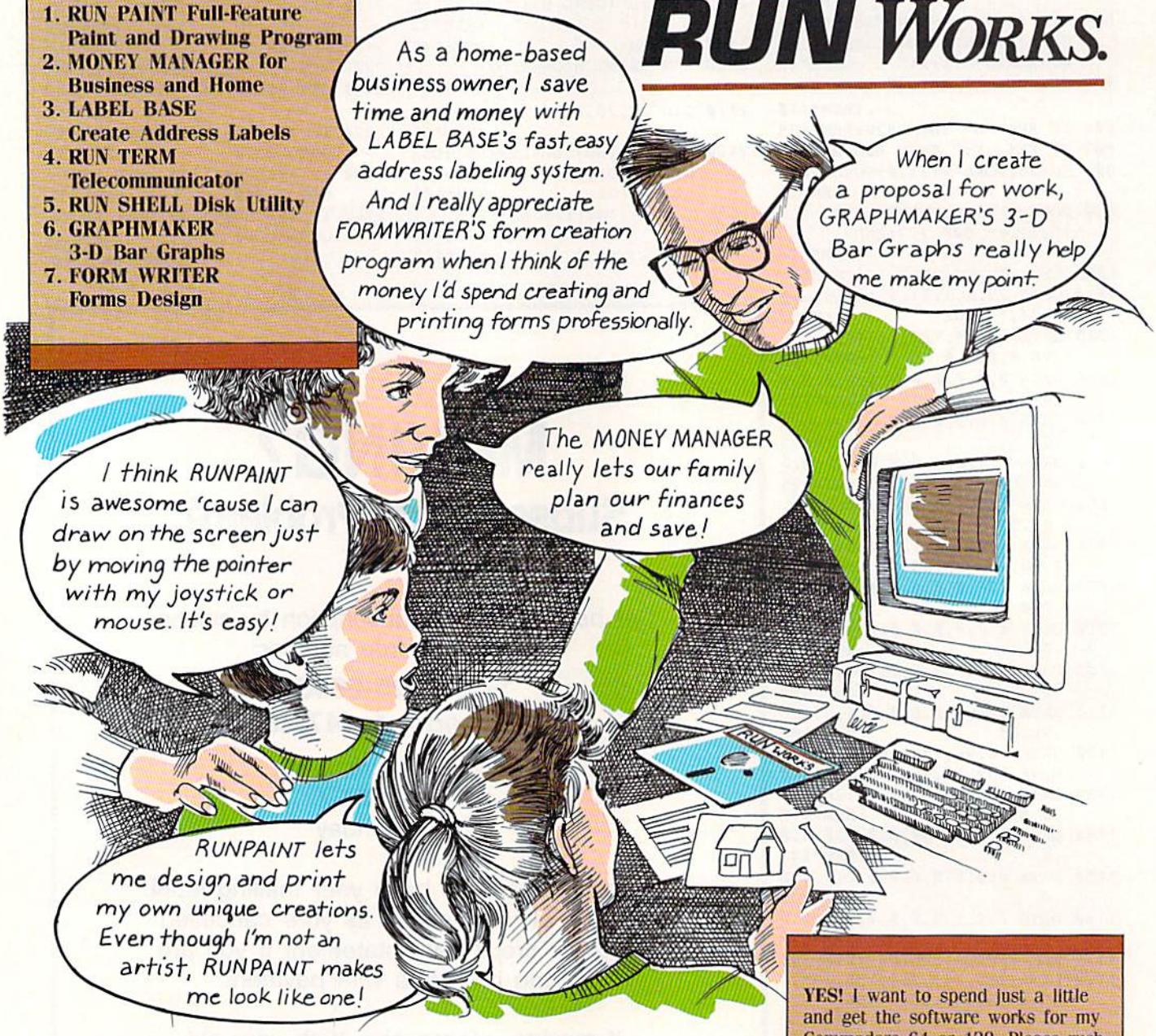
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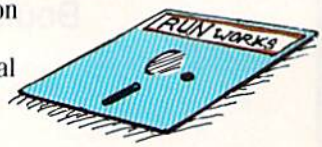

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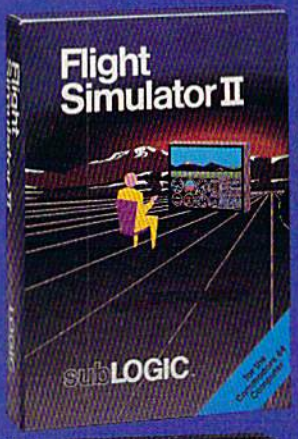

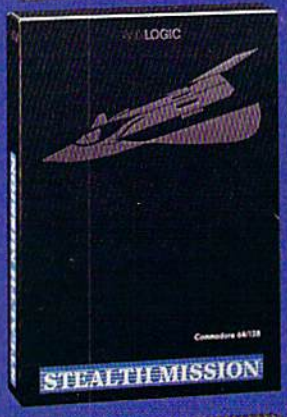

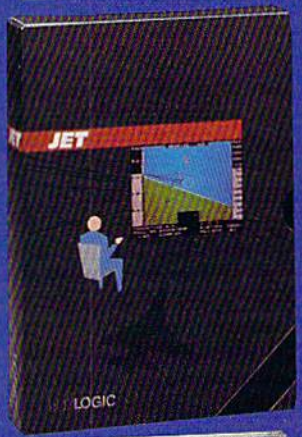

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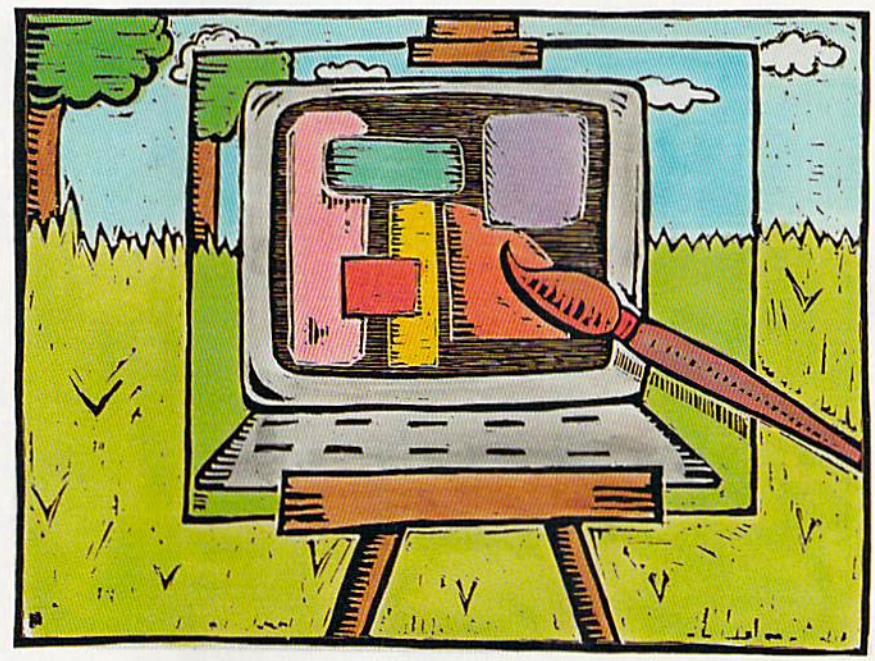

By LOU WALLACE

I recently wanted to use graphics characters to make colored panels in a Basic program I was writing (see the Trivia game in this issue), so I created some simple Basic routines to generate them. Unfortunately, using the Print statement from Basic just wasn't fast enough, and I also needed a way to print data at a specific screen location. So I pulled out my trusty assembler and went to work writing a small utility to do the job. The result is Panels, and since it's a program that can be generally useful beyond my immediate need, we are including it here as a stand-alone offering.

As I indicated, Panels has two functions. One lets you position the cursor at any location on the screen, so the next Print statement will start printing at that location. The other uses the Print statement from machine language to create a variety of panels. In each case, a SYS function transfers parameters to the routine, making both very easy to use. (The machine language is located at 49152, an area often used by C-64 machine language programmers.)

Here are the two commands to include in your program:

```
SYS 49152,X,Y:REM CURSOR POSITION
```

and

```
SYS 49155,X,Y,W,H,C,S,M:REM
  MAKE A PANEL
```

The first positions the cursor at any X (0–39) and Y (0–24) screen location. The second is the actual panel-making routine. X and Y mark the starting location of the panel, W (2–40) is the width of the panel and H (2–25) is the height. If values outside the allowed ranges are passed to the routine, nothing will happen on the screen. Neither will anything happen if X + W is greater than 40 or Y + H is greater than 25, as the panel would be wider or taller than the screen.

C is the color of the panel (0–15), and S is the style (0–5). See Table 1 for a list of the styles. Finally, M (0 or 1) is the mode, with 0 creating a reverse (solid) panel and 1 an unreversed panel.

Keep in mind that, because Panels uses the Print statement, if your panel extends to the bottom of the screen, the screen will scroll up one line. R

Lou Wallace, RUN*'s technical manager, is a prolific and expert graphics programmer.*

Table 1. Panel styles.

Style	Description
0	Square corners
1	Curved corners
2	Solid (no edges)
3	Outlined corners
4	Angled corners

Listing 1. Panels program.

```
1 REM C64 HEX LOADER    :REM*224
2 OPEN 8,8,8,"PANELS,P,W"
                        :REM*113
3 READ A$:IF A$="-1" THEN CLOSE
  8:END                 :REM*71
4 IF LEN(A$)<62 THEN 12:REM*147
5 B$=MID$(A$,1,2Ø)+MID$(A$,22,2
  Ø)+MID$(A$,43,2Ø)     :REM*133
6 FOR I=1 TO 3Ø         :REM*16Ø
7 C$=MID$(B$,(I*2)-1,2):H$=LEFT
  $(C$,1):L$=RIGHT$(C$,1)
                        :REM*2ØØ ►
```

RUN it right: **C-64**

ILLUSTRATED BY NELLE DAVIS

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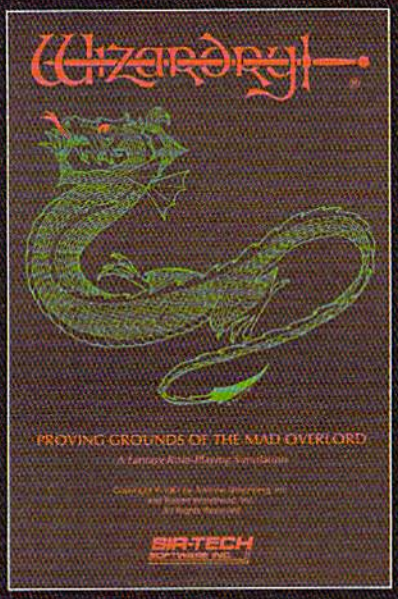

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```
8 H=VAL(H$):IF H$>"9" THEN H=AS
  C(H$)-55                :REM*112
9 L=VAL(L$):IF L$>"9" THEN L=AS
  C(L$)-55                :REM*151
10 BY=H*16+L:PRINT#8,CHR$(BY);
                          :REM*100
11 NEXT:GOTO 3            :REM*107
12 IF LEN(A$)<21 THEN B$=A$:GOT
   O 15                   :REM*112
13 IF LEN(A$)<42 THEN B$=LEFT$(
   A$,20)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 15             :REM*101
14 B$=LEFT$(A$,20)+MID$(A$,22,2
   0)+RIGHT$(A$,LEN(A$)-42)
                          :REM*243
15 FOR I=1 TO LEN(B$)/2:REM*148
16 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                          :REM*195
17 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55              :REM*103
18 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55              :REM*158
19 BY=H*16+L:PRINT#8,CHR$(BY);
                          :REM*93
20 NEXT:GOTO 3            :REM*114
21 REM C64 PANELS MACHINE CODE
                          :REM*160
22 DATA 00C04C06C04C1EC020FD AE
   209EB78E1DC020FDAE 209EB7AC1
   DC0182F0FF             :REM*221
23 DATA 60002FDAE209EB78EC2 C1
   20FDAE209EB78EC3C1 20FDAE209
   EB78EC4C120            :REM*81
24 DATA FDAE209EB78EC5C120FD AE
   209EB78EC6C120FDAE 209EB78EC
   7C120FDAE20            :REM*37
25 DATA 9EB78EC8C1ADC6C1C910 90
   034C1CC0ADC4C1C902 90AECEC4C
   1CEC4C1ADC5            :REM*93
26 DATA C1C90290A1CEC5C1CEC5 C1
   ADC8C1C900D008A000 B900C24C9
   5C0A001B900            :REM*136
27 DATA C28DD2C1ADC7C1C900D0 10
   A000B9E5C199C9C1C8 C009D0F54
   C01C1ADC7C1            :REM*162
28 DATA C901D01A000B9DCC199 C9
   C1C8C009D0F54C01C1 ADC7C1C90
   2D010A000B9            :REM*40
29 DATA D3C199C9C1C8C009D0F5 4C
   01C1ADC7C1C903D010 A000B9EEC
   199C9C1C8C0            :REM*209
30 DATA 09D0F54C01C1A000B9F7 C1
   99C9C1C8C009D0F5AE C3C1ACC2C
   12018C0A915            :REM*215
31 DATA 8D18D0ACC6C1B902C220 D2
   FFADD2C120D2FFADC9 C120D2FFA
   DC4C1C900F0            :REM*79
32 DATA 0EA000ADCAC120D2FFC8 CC
   C4C1D0F4ADCBC120D2 FFA9922 0D
   2FFADC5C1C9            :REM*113
33 DATA 00F03ECEC5C1EEC3C1AD D2
   C120D2FFAEC3C1ACC2 C12018C0A
   DCCC120D2FF            :REM*241
34 DATA ADC4C1C900F00EA000AD CD
   C120D2FFC8CCC4C1D0 F4ADCEC12
   0D2FFA9922 0           :REM*145
35 DATA D2FF4C44C1EEC3C1AEC3 C1
   ACC2C12018C0ADD2C1 20D2FFADC
   FC120D2FFAD            :REM*171
36 DATA C4C1C900F00EA000ADD0 C1
   20D2FFC8CCC4C1D0F4 ADD1C120D
   2FFA9922 0D2           :REM*67
37 DATA FF6000000000000000000 00
   0000000000000000B0 63AE7D207
   DAD63BD7563            :REM*110
38 DATA 697D207D6A636B202020 20
   2020202020206EA36DA5 20A76DA46
   E6FB770B420            :REM*59
39 DATA AA6CAFBA12929000 51C9F 9C
   1E1F9E819596979899 9A9B
                          :REM*5
40 DATA -1                :REM*153
```

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Savings Forecaster

With this short Basic program, you'll know how much you can bank on.

By ROBERT GALLAGHER

Want to save time as well as money? Then use Savings Forecaster to predict the return on your bank account or bonds. Designed for the C-128 in 80-Column mode, this program displays the monthly value of a savings account that has a fixed interest rate. It can also be used to check the value of a Christmas Club account at any point in its life, and even the value of a fixed interest bond.

The program works on the premise that deposits are made the first of the month and interest is compounded and applied at the end of the month. It's pretty straightforward and easy to use; you need only answer a few simple questions and the program does the rest.

The first question is, "What is your initial investment amount?" Enter your beginning deposit or the amount paid for the bond, up to 9999.99. You don't need to prefix the amount with a dollar sign, because the program will do it for you.

Next, the program asks, "What is the annual interest rate?" It expects this number to be in decimal form, so, if the interest rate were 5 ¼ percent, you'd enter 5.25. Don't follow the number with a percent sign (%) or you'll get a "Redo From Start" message on the screen. There's no real harm done, however, if this should happen; you'll just be asked for the interest rate again. Make sure you enter the *annual* interest rate, since the program uses this number to compute the monthly rate.

The third question you need to answer is, "How much will you invest monthly?"

Enter the amount you plan to add to your savings each month, up to 9999.99. Once again, there's no need to enter a dollar sign. If you don't intend to make deposits to this account on a monthly basis, or if you're checking the value of a bond, answer this question with a zero.

A note of caution is in order here. Just pressing the return key in response to any question could cause a problem if you're computing your second or subsequent forecast without clearing the computer's memory. The program will retrieve and use data from a previous forecast unless you change the variables by entering a dollar amount or a zero.

The next question to be answered is, "How many months do you expect to pay into this fund?" Enter the number of months you wish to forecast for this account or bond. Years and partial years must be converted into months. This is the last numerical response that you have to make.

The output of Savings Forecaster includes a list of your inputs, as well as calculations of the total amount you've paid into the account, the total interest earned and the total value of the account or bond. After your data has been entered, you'll be asked if you want the output to go to the printer or to the screen, so you can preview it. If you select the screen, you'll have another chance to get printer output after the screen display is completed. Just respond with a Y and return when asked if you want a hard copy. Finally, you'll be asked if you want to compute another forecast. A Y answer clears the screen and starts you off with the first question. An N terminates the program.

When writing Savings Forecaster, I selected black on white for the screen colors, but you can select your own color preferences by changing the values in line 40. The output format can also be easily changed by varying the number of spaces and pound signs (#) in the Print Using statements. This shouldn't be necessary, however, since the output display can include up to 999 months in the first column and up to $99999.99 in each of the other columns.

The program discards any numbers beyond two decimal places. If your interest rate has been figured to more than two decimal places, you must round it off to one or two places before using it. R

Robert Gallagher, now retired, was a data analyst in maintenance administration with the U.S. Navy.

Listing 1. Savings Forecaster program.

```
10 REM - SAVINGS FORECASTER
                          :REM*120
20 REM BY -> BOB GALLAGHER <-
                          :REM*68
30 SCNCLR                  :REM*7
40 COLOR 5,1:COLOR 6,2 :REM*228
50 PRINT:PRINT TAB(30)"SAVINGS
   FORECASTER"             :REM*140
60 PRINT:PRINT"THIS FORECASTER
   COMPOUNDS INTEREST MONTHLY..
   ........."              :REM*116
70 PRINT:INPUT"WHAT IS YOUR INI
   TIAL INVESTMENT AMOUNT ";A
                          :REM*163
80 PRINT:INPUT"WHAT IS THE ANNU
   AL INTEREST RATE (I.E. 5.25)
    ";I                   :REM*156
90 PRINT:INPUT"HOW MUCH WILL YO
   U INVEST MONTHLY ";MA
                          :REM*212
100 PRINT:INPUT"HOW MANY MONTHS
     DO YOU EXPECT TO PAY INTO
    THIS FUND ";P         :REM*77
110 PRINT:INPUT"OUTPUT TO <P>RI
    NTER OR <S>CREEN ";O$
                          :REM*38
120 IF O$="P" THEN GOTO 370 ELS
    E 130                 :REM*65
130 PRINT:PRINT USING"INITIAL I
    NVESTMENT - #$####.##";A
```

RUN it right: **C-128, in 80-Column mode**

```
                                :REM*62
14Ø PRINT USING"ANNUAL INTEREST
    RATE -{3 SPACEs}##.##";I
                                :REM*125
15Ø PRINT USING"MONTHLY INVESTM
    ENT - #$####.##";MA:REM*199
16Ø PRINT USING"NUMBER OF MONTH
    S -{9 SPACEs}###";P:REM*236
17Ø PRINT:PRINT" MO{7 SPACEs}AM
    T PAID{7 SPACEs}INTEREST{1Ø
     SPACEs}VALUE"      :REM*115
18Ø PRINT"==================
    ==========================
    "                           :REM*88
19Ø I1=I/12ØØ               :REM*181
2ØØ M1=A+(A*I1)              :REM*46
21Ø AP=A                    :REM*2Ø1
22Ø IE=M1-AP                 :REM*57
23Ø V=AP+IE                 :REM*133
24Ø PRINT USING"###{5 SPACEs}#$
    #####.##{5 SPACEs}#$#####.#
    #{5 SPACEs}#$#####.##";1,AP
    ,IE,V                       :REM*89
25Ø FOR X=2 TO P             :REM*23
26Ø V=V+MA+(V+MA)*I1         :REM*28
27Ø AP=A+MA*(X-1)            :REM*195
28Ø IE=V-AP                  :REM*1Ø6
29Ø V=AP+IE                  :REM*193
3ØØ IF X<P+1 THEN PRINT USING"#
    ##{5 SPACEs}#$#####.##{5 SP
    ACEs}#$#####.##{5 SPACEs}#$
    #####.##";X,AP,IE,V :REM*63
31Ø NEXT X                   :REM*1Ø6
32Ø PRINT:INPUT"HERE'S ANOTHER
    CHANCE - DO YOU WISH A HARD
     COPY <Y>ES OR <N>O ";C$
                                :REM*152
33Ø IF C$="Y" THEN GOTO 37Ø ELS
    E 34Ø                       :REM*165
34Ø PRINT:INPUT"DO YOU WISH TO
    COMPUTE ANOTHER <Y>ES OR <N
    >O ";F$                     :REM*22Ø
35Ø IF F$="Y" THEN GOTO 3Ø ELSE
     END                        :REM*2Ø5
36Ø END                         :REM*233
37Ø OPEN 4,4                    :REM*2Ø6
38Ø PRINT#4,USING"INITIAL INVES
    TMENT - #$####.##";A
                                :REM*212
39Ø PRINT#4,USING"ANNUAL INTERE
    ST RATE -{3 SPACEs}##.##";I
                                :REM*25Ø
4ØØ PRINT#4,USING"MONTHLY INVES
    TMENT - #$####.##";MA
                                :REM*244
41Ø PRINT#4,USING"NUMBER OF MON
    THS -{9 SPACEs}###";P
                                :REM*55
42Ø PRINT#4:PRINT#4," MO{7 SPAC
    Es}AMT PAID{7 SPACEs}INTERE
    ST{1Ø SPACEs}VALUE":REM*242
43Ø PRINT#4,"==================
    ==========================
    ==="                        :REM*236
44Ø I1=I/12ØØ               :REM*188
45Ø M1=A+(A*I1)              :REM*37
46Ø AP=A                    :REM*194
47Ø IE=M1-AP                 :REM*62
48Ø V=AP+IE                 :REM*132
49Ø PRINT#4,USING"###{5 SPACEs}
    #$#####.##{5 SPACEs}#$#####
    .##{5 SPACEs}#$#####.##";1,
    AP,IE,V                     :REM*46
5ØØ FOR X=2 TO P             :REM*28
51Ø V=V+MA+(V+MA)*I1         :REM*27
52Ø AP=A+MA*(X-1)           :REM*254
53Ø IE=V-AP                  :REM*1Ø9
54Ø V=AP+IE                  :REM*2ØØ
55Ø IF X<P+1 THEN PRINT#4,USING
    "###{5 SPACEs}#$#####.##{5
    SPACEs}#$#####.##{5 SPACEs}
    #$#####.##";X,AP,IE,V
                                :REM*112
56Ø NEXT X                   :REM*97
57Ø PRINT#4                  :REM*57
58Ø CLOSE 4:GOTO 34Ø        :REM*172
```

■

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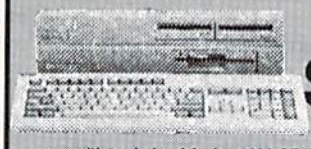

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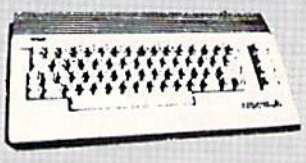

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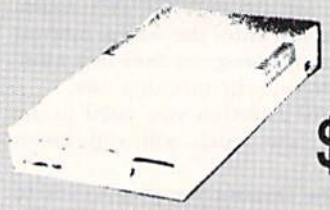

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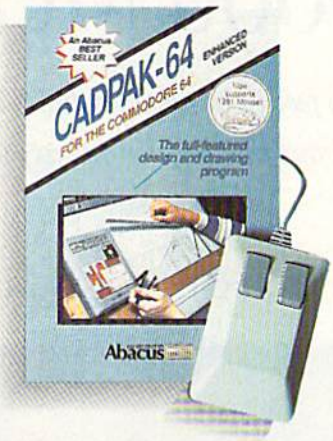

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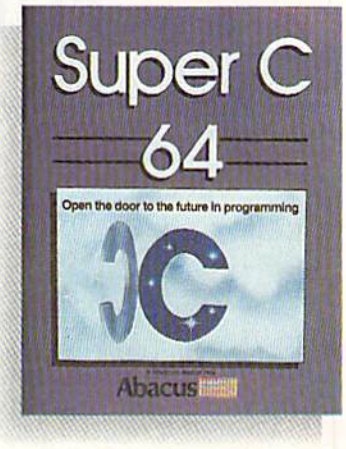

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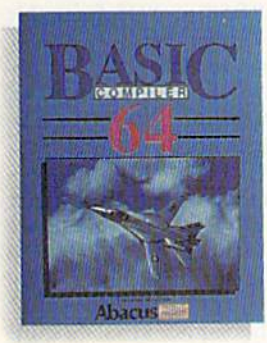

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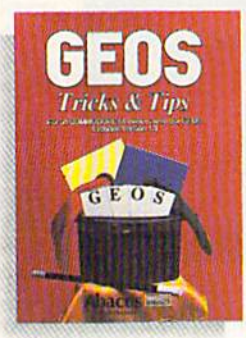

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For Good Measure

How many feet in a meter, or pints in a liter? Find out this quick and easy way.

By MICHAEL BROUSSARD

Changing feet to meters, gallons to liters, Celsius to Fahrenheit? How many quarts are in a bushel? If you ever need to convert measurements of length, area, volume, weight, arc or temperature into other units, Measure Mate will make it easy. It knows a multitude of units, from the common to the obscure, and you can add others.

Measure Mate is written in Basic for C-64 mode. Just type in the program in Listing 1, and be sure to save it to disk before running it.

Using Measure Mate is easy. When you type RUN, the screen clears and the work display appears. There's a brief delay while the program builds some internal tables, then the cursor appears in a window near the top of the screen, next to a prompt that asks "How Many?", referring to the number of units in the measurement you want to convert.

Suppose you want to know the number of inches in two yards. The number of units in this case is two, so type 2 in the window and press the return key. If you make a mistake, use the delete key to back up.

Then the cursor will move to the next window, labeled "Convert From?". Type YARDS (or YD, or even YAR) and press return. Measure Mate maintains an internal list of names of units of measure, and it looks there for the first word that contains, in the same sequence, the letters typed in the window. For example, the single letter M is interpreted as meters, MI is taken to mean miles and MIC expands to microns. (For a complete list of the units of measurement and names the program knows, examine the Data statements beginning at line 2010 of the listing.) Shortly after you press the return key, Measure Mate will update the window, showing you the long form of

the unit name—YARDS, in this case.

When the cursor moves to the window labeled "Convert To?", type IN and press return. Measure Mate will update the window to display the word INCHES and show the result of the conversion in the lower half of the screen:

```
2 YARDS = 72 INCHES
```

That's all there is to it!

The input windows then clear, and the cursor returns to the top so you can do another conversion. If you're all done, type Q (or QUIT) to exit the program. You can abort a conversion in progress at any time by pressing the clear key.

The results of up to four conversions are displayed on the screen at a time. When you do a fifth conversion, the first one disappears and the others scroll up. The program remembers the first 300 conversions it does, even though it can't display them all at once.

To print the four conversions shown on the screen, press the F1 key. You can print all of the stored conversions by pressing the F7 key.

Program Pointers

Measure Mate uses a shorthand to represent area and volume measurements, such as square meters and cubic yards. Instead of typing the word "square" or "cubic," simply append a 2 or 3 to the name of the unit. For example, use YARDS3 or YD3 for cubic yards and FT2 for square feet.

To distinguish between dry and liquid measures, either type the word DRY or prefix the measure name with a D; that is, PINTS refers to liquid pints, while DRY PINTS, DPINTS and DPTS are the dry kind. On the other hand, since the generally accepted default for OUNCES is the weighty variety (16 ounces in a pound), you must specify FLUID OUNCES, FLOUNCES or FLOZ if you mean the liquid kind (8 fluid ounces in a cup).

Use the "conversion history" on the screen to help do multistep conversions. For example, suppose you want to convert eight meters to feet and inches. First convert from meters to feet by typing 8 in the first window, M in the second window and FT in the third. You'll see the following result:

```
8 METERS = 26.2467192 FEET
```

Now do another conversion to change the fractional part of the foot measurement to inches by typing .2467192, FT and IN. The new result is:

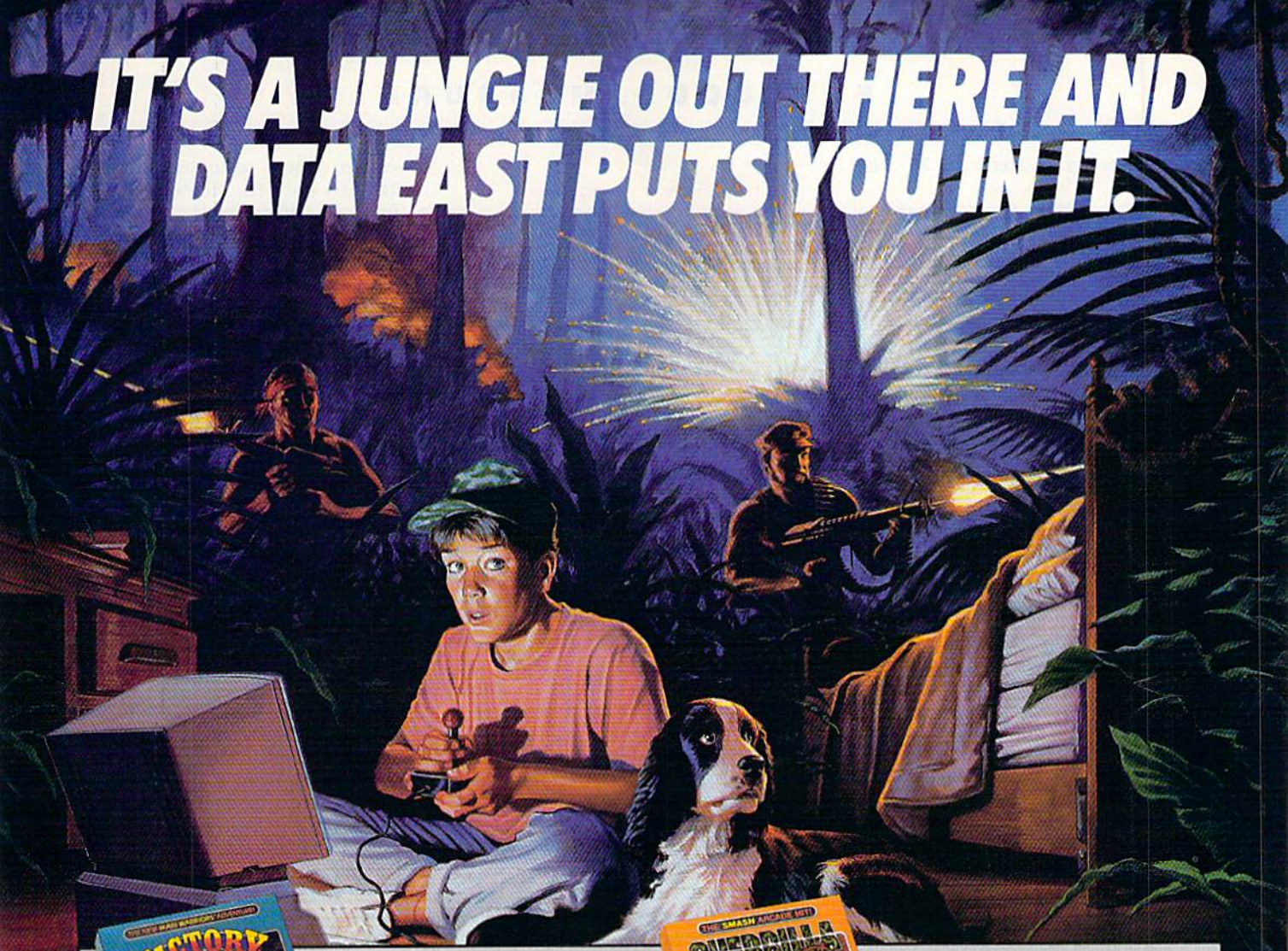
```
.2467192 FEET = 2.9606304 INCHES
```

Because 2.9606304 is very close to 3, the ►

RUN it right: **C-64; printer (optional)**

ILLUSTRATED BY KEVIN HAWKES

IT'S A JUNGLE OUT THERE AND DATA EAST PUTS YOU IN IT.



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eight meters converts to 26 feet, 3 inches.

If the program detects an error during a conversion, such as an attempt to convert inches to degrees Centigrade, it displays an error message in the status window at the bottom of the screen. This message remains visible for several seconds to make sure you have time to read and understand it. Then you're allowed to go ahead with another conversion. You can shorten the error message display time by pressing the space bar or the return key.

If you ask for a conversion that has an extremely large result, the program may terminate unexpectedly with an Overflow message. This means that the result is too large for Basic to calculate. If this happens, just restart the program.

Here are some miscellaneous notes about the units Measure Mate recognizes: Degrees, minutes and seconds refer to arc; grains is a measure of avoirdupois weight, not troy; minims and drams are fluid measures; the ton is the standard short ton (2000 pounds); and fluid measures such as quarts and gallons are standard U.S. calibrations.

Technical Notes

Measure Mate expects the printer to be device number 4 on the serial bus. You can alter this by changing the value assigned to variable PR in the first line of the program.

The program works by using a set of base units for each measurement type. For example, the base unit for length is the meter, so to convert inches to feet, it converts the inches to meters and then the meters to feet. Expressing every other length measurement in terms of meters is an elegant technique to convert from one to the other without having to know hundreds of formulas. However, it's subject to rounding errors. For example, when converting 5280 feet into miles, the result is .99999999—very close to but not exactly the expected answer of 1.

In order to be more user-friendly, Measure Mate examines each result before printing. If it's not in scientific notation (no E), if it contains a decimal and if the three places to the right of the decimal are 999 or 000, the program rounds up or down as appropriate. Thus, 5280 feet comes out to be 1 mile. If you prefer not to have the program do such rounding, you can disable this feature by setting variable RF to 0 in the first line of the listing.

Table 1. Types of measurement that Measure Mate handles.

Code	Type	Base Measure
1	Length	Meter
2	Area	Square Meter
3	Volume	Cubic Meter
4	Weight	Gram
5	Arc	Degree

Measure Mate is constructed so you can add your own units of measurement, provided that they express length, area, volume, weight or arc. (Temperature is a special case.) Each unit is represented by a Data statement, so adding a unit is as simple as adding a line to the program.

In the process, you need to refer to Table 1 for the code for the type of measurement you're adding. Table 1 also shows the base measure for each kind of measurement the program knows. Code 6, which specifies temperature, is not included, because it has no base measure. For this reason, you can't add more temperature measures without changing the program.

For instance, suppose you want to add a hypothetical unit of length called a gribble, which is exactly one-half meter long. For proper program operation, the Data statements are sorted in approximately alphabetical order (all the A's are together, as are the Bs, and so on), so, to add GRIBBLE to the program, we must add a Data statement in the Gs—say, after GALLONS.

The first value in the Data statement tells how many different names Measure Mate will know for this unit. Suppose you want it to understand both GRIBBLES and GBS. That's two names, so the first value in the Data statement is 2. The second value in the Data statement specifies the type of measurement. The gribble is a measure of length, and 1 is the code for length, so that's the second value in the Data statement. The third value specifies how a gribble compares to the base measure used for length—the meter. A gribble is half a meter, so the third value is .5. Finally, the Data statement includes all the names you want the program to recognize for gribbles—in this case, GBS and GRIBBLES. Notice that the plural form of the name is used, so the program will recognize GBS and GRIBBLES, in addition to GRIBBLE, GB and GRIB.

The complete Data statement looks like this:

```
2325 DATA 2,1,.5,GBS,GRIBBLES
```

I deliberately didn't place the unit names in the Data statements in exact alphabetical order. MILES is before MICRONS, so if you type in MI as an abbreviation, Measure Mate will assume you mean miles instead of microns. If you like, you can rearrange the Data statements so the program "prefers" units of your choice. Just be sure all those with the same first letter are together, or you'll cause the program's hashing search algorithm to break. (This explains why there are two Data statements for pounds—one with POUNDS and one with the abbreviation LB. They begin with different letters.)

Give Measure Mate a try. Your kids will have fun using it to learn about basic conversions, and you may learn a thing or two yourself. For instance, most people know that normal body temperature is 98.6 degrees Fahrenheit, but, quick, what is the Centigrade equivalent? ®

Michael Broussard, a systems analyst in the manufacture of fault-tolerant super-minicomputers, has authored many RUN *programs over the years.*

Listing 1. Measure Mate program.

```
100 PR=4:RF=1:REM PRINTER DEVICE NUMBER, ROUNDING FLAG :REM*58
110 FOR K=1 TO 6:READMN$(K):NEXT :REM*76
120 FORK=1TO40:BL$=BL$+" ":Z$=Z$+"{COMD LB.}":L$=L$+"{SHFT *}":NEXT:X$=LEFT$(BL$,12) :REM*215
130 L$=LEFT$(L$,36):POKE53281,1:PRINT"{CTRL 7}" :REM*247
140 PRINT"{SHFT CLR}{CRSR DN}"X$"{CTRL 3}{COMD A}{14 SHFT *s}{COMD S}":PRINTX$"{SHFT -} MEASURE MATE {SHFT -}" :REM*30
150 PRINTX$"{COMD Z}{14 SHFT *s}{COMD X}{CTRL 7}{2 CRSR DNs}" :REM*80
160 PRINT"{9 SPACEs}HOW MANY: "
:R=6:C=19:W=12:FF=1:GOSUB7700:PRINT :REM*143
170 PRINT"{CRSR DN}{5 SPACEs}CONVERT FROM: ":R=8:GOSUB7700:PRINT :REM*27
180 PRINT"{CRSR DN}{7 SPACEs}CONVERT TO: ":R=10:GOSUB7700:PRINT:PRINT"{CRSR DN}"Z$ :REM*245
190 PRINT"{8 CRSR DNs} {CTRL 3} ►
```

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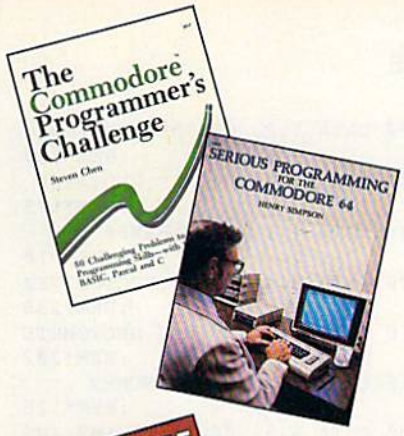
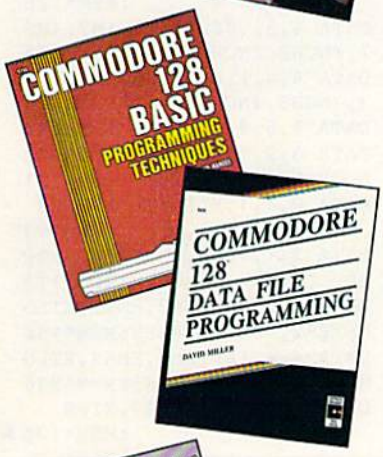
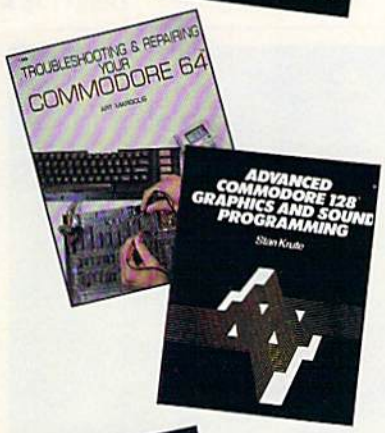
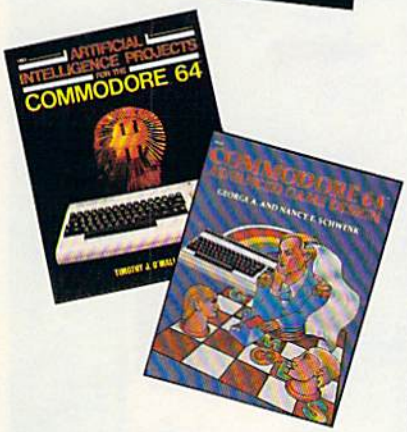
```
    {COMD A}"L$"{COMD S}":PRINT
    " {SHFT -}"SPC(36)"{SHFT -}
    ":PRINT" {COMD Z}"L$"{COMD
    X}{COMD 7}";          :REM*140
200 R=23:C=3:GOSUB1020:PRINTTAB
    (6)"{CTRL 9}{CTRL 3} PLEASE
     WAIT...INITIALIZING {CTRL
    0}{CTRL 7}";          :REM*242
210 NM=200:DIMM$(NM),P(NM),T(NM
    ),F(NM),Y(26),R$(300):NM=0
                          :REM*4
220 FOR K=1TO26:Y(K)=0:NEXT
                          :REM*80
230 READ N:IFN=0THEN280   :REM*8
240 READ T1,T2            :REM*52
250 FORK=1TON:NM=NM+1:T(NM)=T1:
    F(NM)=T2:READM$(NM):P(NM)=N
    -K                    :REM*206
260 J= ASC(LEFT$(M$(NM),1))-64:
    IF Y(J)=0THENY(J)=NM:REM*76
270 NEXTK:GOTO230         :REM*124
280 GOSUB1020:PRINTLEFT$(BL$,34
    );                    :REM*176
290 CF=0:R=6:C=19:W=12:FF=0:GOS
    UB770:IFCF THEN 610   :REM*49
300 IFS$=""THENGOSUB690:GOTO290
                          :REM*216
310 K=0:IF S$="Q"ORS$="QUIT"THE
    N630                  :REM*74
320 K=K+1:IFK>LEN(S$)THEN350
                          :REM*107
330 X$=MID$(S$,K,1):IF(X$>="0"A
    NDX$<="9")ORX$="."ORX$="E"O
    RX$="-"THEN320        :REM*218
340 GOSUB690:GOTO290      :REM*234
350 V=VAL(S$):IFV=0ANDS$<>"0"TH
    ENGOSUB690:GOTO290    :REM*164
360 R=8:C=19:W=12:GOSUB770:IF C
    F THEN610             :REM*236
370 GOSUB950:IFS$=""THEN360
                          :REM*240
380 S2$=S$:T2=TX:F2=FX:GOSUB102
    0:PRINT"{CTRL 9}"S$"{CTRL 0
    }";                   :REM*82
390 R=10:C=19:W=12:GOSUB770:IF
    CF THEN 610           :REM*15
400 GOSUB950:IFS$=""THEN390
                          :REM*57
410 S3$=S$:T3=TX:F3=FX:GOSUB102
    0:PRINT"{CTRL 9}"S$"{CTRL 0
    }";                   :REM*155
420 IF T2<>T3THENGOSUB710:GOTO6
    10                    :REM*162
430 IF T2=6 THEN450       :REM*244
440 X=V*F2/F3:GOTO490     :REM*160
450 V2=V:X$=LEFT$(S2$,1):Y$=LEF
    T$(S3$,1):IF X$="K"THENV2=V
    2-273.16:X=V2         :REM*94
460 IF X$="F" THEN V2=(V2-32)*5
    /9:X=V2               :REM*3
470 IF Y$="F" THEN X=9/5*V2+32
                          :REM*101
480 IF Y$="K" THEN X=V2+273.16
                          :REM*121
490 LC=LC+1:IF LC>300 THEN LC=1
                          :REM*241
500 X$=STR$(X):K=0:D=0:IF RF=0
    THEN 560              :REM*20
510 K=K+1:D=D-K*(MID$(X$,K,1)="
    ."):IFMID$(X$,K,1)="E"THEN5
    60                    :REM*131
520 IF K<=LEN(X$) THEN 510
                          :REM*84
530 IF (D=0)OR((D+4)>LEN(X$))TH
    EN 560                :REM*79
540 IF MID$(X$,D+1,3)="000" THE
    N X$=STR$(INT(X)):GOTO560
                          :REM*136
550 IF MID$(X$,D+1,3)="999" THE
    N X$=STR$(INT(X+.1))
                          :REM*166
560 ZT=T2:ZN=V:Z$=S2$:GOSUB1030
    :K1=K:ZT=T3:ZN=X:Z$=S3$:GOS
    UB1030                :REM*207
570 R$(LC)=STR$(V)+" "+LEFT$(S2
    $,K1)+" ="+X$+" "+LEFT$(S3$
    ,K)                   :REM*54
580 R$(LC)=R$(LC)+LEFT$(BL$,70-
    LEN(R$(LC)))          :REM*245
590 X=LC-3:IFX<1THENX=1:REM*188
600 C=1:FORR=14TO20STEP2:GOSUB1
    020:PRINTR$(X);:X=X+1:NEXT
                          :REM*54
610 FF=1:R=6:C=19:W=12:GOSUB770
    :R=8:GOSUB770:R=10:GOSUB770
    :FF=0                 :REM*179
620 GOTO 290              :REM*192
630 PRINT"{SHFT CLR}":END
                          :REM*191
640 Z1=1:GOTO660          :REM*71
650 Z1=LC-3:IF Z1<1 THEN Z1=1
                          :REM*116
660 Z2=LC:IF (Z2-Z1)<0 THEN RET
    URN                   :REM*12
670 CLOSE4:OPEN4,PR:PRINT#4:FOR
    Z=Z1TOZ2:PRINT#4,R$(Z):NEXT
                          :REM*105
680 PRINT#4:CLOSE4:RETURN
                          :REM*21
690 X$="ENTER A NUMBER OR Q TO
    QUIT":GOTO720         :REM*167
700 X$="UNKNOWN MEASUREMENT: "+
    S$:S$="":GOTO720      :REM*13
710 X$="CAN'T CONVERT "+MN$(T2)
    +" TO "+MN$(T3):GOTO720
                          :REM*81
720 K=(33-LEN(X$))/2:IFK>0THENX
    $=LEFT$(BL$,K)+X$+LEFT$(BL$
    ,K)                   :REM*119
730 IF LEN(X$)=32THENX$=X$+" "
                          :REM*127
740 R=23:C=3:GOSUB1020:PRINT"{C
    TRL 3}{CTRL 9} "X$"{CTRL 0}
    {CTRL 7}";:K=1        :REM*243
750 GETX$:IFX$<>" "ANDX$<>CHR$(
    13)THENK=K+1:IFK<300THEN750
                          :REM*107
760 GOSUB1020:PRINTLEFT$(BL$,35
    );:RETURN             :REM*28
770 GOSUB1020:PRINT"{CTRL 9}"LE
    FT$(BL$,W)"{CTRL 0}";:N=0:S
    $="":IF FF THENRETURN
                          :REM*29
780 GOSUB 1020:PRINT"{CTRL 9}";
                          :REM*76
790 POKE204,0:GETX$:IFX$=""THEN
    790                   :REM*77
800 IF ASC(X$)=133 THEN GOSUB65
    0:GOTO790             :REM*246
810 IF ASC(X$)=136 THEN GOSUB64
    0:GOTO790             :REM*144
820 IF ASC(X$)=147 THEN CF=1:RE
    TURN                  :REM*143
830 POKE204,1:POKE212,0:X=ASC(X
    $):IFX<>13THEN880     :REM*60
840 PRINT"{CTRL 9} ";:IFLEN(S$)
    =WTHENPRINT"{CRSR LF}{CTRL
    0}";                  :REM*50
850 IF RIGHT$(S$,1)=" " THEN S$
    =LEFT$(S$,LEN(S$)-1):GOTO85
    0                     :REM*196
860 IF LEFT$(S$,1)=" " THEN S$=
    RIGHT$(S$,LEN(S$)-1):GOTO86
    0                     :REM*14
870 RETURN                :REM*247
880 IFX<>20ORN=0THEN920   :REM*45
890 N=N-1:S$=LEFT$(S$,N):GOSUB1
    020:PRINT"{CTRL 9}"S$;:POKE
    212,0:PRINT"{2 SHFT SPACEs}
    {CRSR LF}";           :REM*251
900 IFLEN(S$)=W-1THENPRINT"{CTR
    L 0}";                :REM*117
910 C=C+N:GOSUB1020:C=C-N:GOTO7
    90                    :REM*200
920 IFN=WTHEN790          :REM*194
930 IF(X>31ANDX<129)OR(X>161)TH
    ENPRINTX$;:S$=S$+X$:N=N+1
                          :REM*18
940 GOTO790               :REM*8
950 IF S$="" THEN RETURN
                          :REM*128
960 L=LEN(S$):X$=LEFT$(S$,1):IF
     X$<"A"THENGOSUB700:RETURN
                          :REM*19
970 K=Y(ASC(X$)-64):IF K=0THENG
    OSUB700:RETURN        :REM*56
980 IF X$<>LEFT$(M$(K),1) THEN
    GOSUB700:RETURN       :REM*116
990 IF L<=LEN(M$(K)) THEN IF LE
    FT$(M$(K),L)=S$THEN1010
                          :REM*213
1000 K=K+1:GOTO980        :REM*196
1010 S$=M$(P(K)+K):TX=T(K):FX=F
     (K):RETURN           :REM*59
1020 POKE783,0:POKE781,R:POKE78
     2,C:SYS65520:RETURN:REM*55
1030 K=LEN(Z$):IF ZT<>6 AND INT
     (ZN)=1 THEN IF RIGHT$(Z$,1
     )="S"THEN K=K-1      :REM*240
1040 RETURN               :REM*154
2000 DATA LENGTH,WEIGHT,AREA,VO
     LUME,ARC DEG,TEMP.:REM*183
2010 DATA 1,3,4046.85637,ACRES
                          :REM*68
2020 DATA 1,3,100,ARES :REM*231
2030 DATA 1,1,10E-11,ANGSTROMS
                          :REM*119
2040 DATA 1,1,1.49098E11,AUS
                          :REM*11
2050 DATA 1,4,.119240,BARRELS
                          :REM*35
2060 DATA 1,4,.035239,BUSHELS
                          :REM*173
2070 DATA 1,6,0,CELSIUS:REM*248
2080 DATA 1,6,0,CENTIGRADE
                          :REM*213
2090 DATA 2,2,.01,CGS,CENTIGRAM ►
```









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```
S                              :REM*142
210Ø DATA 1,2,.2,CARATS:REM*123
211Ø DATA 2,4,1E-5,CLS,CENTILIT
     ERS                       :REM*46
212Ø DATA 2,1,.Ø1,CMS,CENTIMETE
     RS                        :REM*1Ø9
213Ø DATA 4,3,1ØE-5,CM2,CMS2,CE
     NTIMETER2,CENTIMETERS2
                               :REM*2ØØ
214Ø DATA 4,4,1ØE-7,CM3,CMS3,CE
     NTIMETER3,CENTIMETERS3
                               :REM*125
215Ø DATA 1,1,2Ø.1168,CHAINS
                               :REM*17Ø
216Ø DATA 1,1,.4572,CUBITS
                               :REM*172
217Ø DATA 1,4,2.36588E-4,CUPS
                               :REM*1Ø
218Ø DATA 2,2,.1,DGS,DECIGRAMS
                               :REM*71
219Ø DATA 2,4,.Ø1,DALS,DEKALITE
     RS                        :REM*177
22ØØ DATA 2,1,1Ø,DAMS,DEKAMETER
     S                         :REM*142
221Ø DATA 2,4,1E-4,DLS,DECILITE
     RS                        :REM*88
222Ø DATA 2,1,.1,DMS,DECIMETERS
                               :REM*254
223Ø DATA 1,5,.Ø174533,DEGREES
                               :REM*52
224Ø DATA 1,4,3.696588E-6,DRAMS
                               :REM*17Ø
225Ø DATA 3,4,5.5Ø6Ø845E-4,DPTS
     ,DPINTS,DRY PINTS         :REM*155
226Ø DATA 3,4,1.1Ø121623E-3,DQT
     S,DQUARTS,DRY QUARTS
                               :REM*14
227Ø DATA 1,6,Ø,FAHRENHEIT
                               :REM*93
228Ø DATA 3,1,.3Ø48,FT,FOOT,FEE
     T                         :REM*149
229Ø DATA 3,3,.Ø929Ø3,FT2,FOOT2
     ,FEET2                    :REM*11
23ØØ DATA 2,4,.Ø28316847,FT3,FE
     ET3                       :REM*158
231Ø DATA 1,1,1.8288,FATHOMS
                               :REM*194
232Ø DATA 5,4,2.95736189E-5,FLO
     ZS,FL OZS,FLOUNCES,FL OUNC
     ES,FLUID OUNCES           :REM*12
233Ø DATA 1,1,2Ø1.168,FURLONGS
                               :REM*2Ø6
234Ø DATA 2,2,1,GMS,GRAMS
                               :REM*118
235Ø DATA 2,4,3.7854E-3,GALS,GA
     LLONS                     :REM*1Ø2
236Ø DATA 1,4,1.18294E-4,GILLS
                               :REM*74
237Ø DATA 1,2,.Ø647989,GRAINS
                               :REM*13Ø
238Ø DATA 2,3,1E4,HAS,HECTARES
                               :REM*175
239Ø DATA 1,1,.1Ø16,HANDS
                               :REM*1Ø
24ØØ DATA 2,4,.1,HLS,HECTOLITER
     S                         :REM*236
241Ø DATA 2,1,1ØØ,HMS,HECTOMETE
     RS                        :REM*2Ø2
242Ø DATA 1,1,.Ø254,INCHES
                               :REM*126
243Ø DATA 4,3,.ØØØ64516,IN2,INS
     2,INCH2,INCHES2           :REM*23Ø
244Ø DATA 4,4,1.6387E-5,IN3,INS
     3,INCH3,INCHES3           :REM*116
245Ø DATA 1,6,Ø,KELVIN :REM*245
246Ø DATA 3,2,1ØØØ,KGS,KILOS,KI
     LOGRAMS                   :REM*121
247Ø DATA 2,4,1,KLS,KILOLITERS
                               :REM*93
248Ø DATA 2,1,1ØØØ,KMS,KILOMETE
     RS                        :REM*115
249Ø DATA 4,3,1E6,KM2,KMS2,KILO
     METER2,KILOMETERS2:REM*15Ø
25ØØ DATA 4,4,1E9,KM3,KMS3,KILO
     METER3,KILOMETERS3:REM*236
251Ø DATA 1,2,1.45939E7,KIPS
                               :REM*12Ø ►
```

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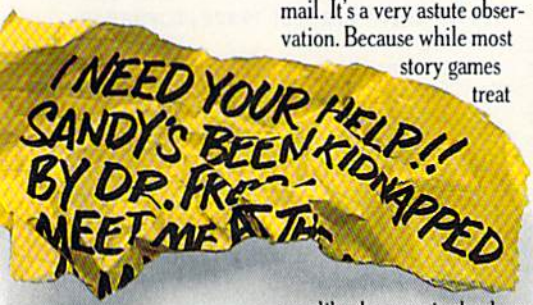
That's more than great fan mail. It's a very astute observation. Because while most story games treat you like the meat in the dog food factory, Lucasfilm story games treat you like a human being who just wants some good clean fun.



The fun starts with an engaging plot, hot graphics and tasty puzzles. But what keeps it going is a unique design that lets you play the game instead of fighting the computer.

THE NO-TYPING INTERFACE.

Today's story games evolved from text adventures. The interface, in most cases, remained in the swamp.

In *Maniac Mansion*,® a movie-style "cut-scene" quickly establishes the characters' personalities.

Just three "clicks," and you'll send *Zak McKracken*™ over to the pawn shop counter to buy a pair of nose glasses.

With conventional story games, whenever you want your character to do something, you type. And type. And type.

Suppose you want to pick up a green leafy object. Well, you might try typing, "pick up plant." If that doesn't work, you might try "bush," "shrub," "tree," and so on. After a while, you might try a different form of entertainment.

Not with Lucasfilm's new "point 'n' click" interface, though. All the words you need are right on the screen. Just click the cursor on them to choose characters, objects, and actions.

Now you can play an entire fifty hour game without typing a single word. Or putting your life on hold until you realize the green leafy thing is a...plastic fern.

MORE STORY. LESS GORY.

Most story game designers seem to think people love to get clobbered.

We don't. After all, how much fun can it be to have a fatal accident every three and a half minutes... then reload your saved game, take a few timid steps forward, and save it again. Seems more like paranoia than entertainment.

That's why Lucasfilm story games make it downright difficult to die. Oh, you'll get into major hot water all right, but you'll have the fun of getting out of it, too.

LET'S GET CRAZY TOGETHER.

Just pick up a copy of *Maniac Mansion*,® the comedy thriller about a kidnapped cheerleader, a very mad scientist, and a hilariously creepy rescue mission.

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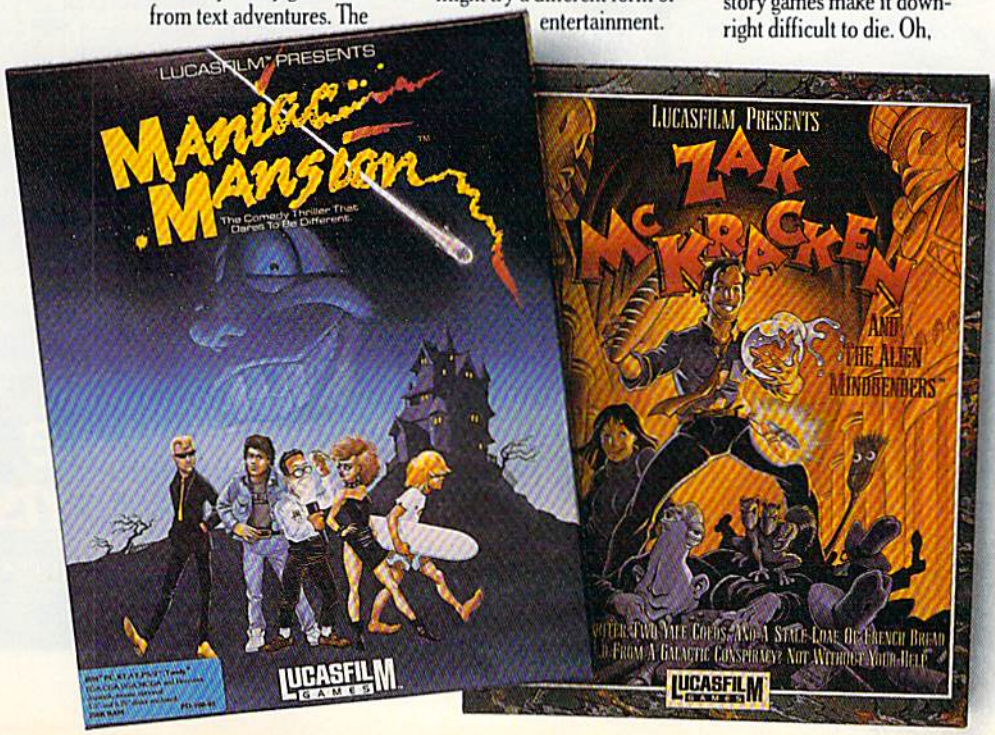
You'll love the twisty plots and the goofy characters. You'll crack up constantly with the zany one-liners and sight gags. And you'll go just a little crazy with the mind-bending puzzles.

Crazy, but nicely crazy.

LUCASFILM™ GAMES



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```
252Ø DATA 1,4,.ØØ1,LITERS
                        :REM*214
253Ø DATA 1,2,453.5923672,LBS
                        :REM*14
254Ø DATA 1,1,4828.Ø319,LEAGUES
                        :REM*15
255Ø DATA 2,1,9.43483E15,LIGHT
     YRS,LIGHT YEARS    :REM*157
256Ø DATA 1,1,.2Ø1168,LINKS
                        :REM*223
257Ø DATA 2,1,1,M,METERS:REM*12
258Ø DATA 3,3,1,M2,METER2,METER
     S2                 :REM*159
259Ø DATA 3,4,1,M3,METER3,METER
     S3                 :REM*95
26ØØ DATA 1,1,16Ø9.344,MILES
                        :REM*218
261Ø DATA 1,1,1ØE-7,MICRONS
                        :REM*2
262Ø DATA 1,1,2.54E-5,MILS
                        :REM*1Ø3
263Ø DATA 1,4,6.16Ø98E-8,MINIMS
                        :REM*56
264Ø DATA 4,3,2.589988E6,MI2,MI
     S2,MILE2,MILES2    :REM*185
265Ø DATA 4,4,4.16818E9,MI3,MIS
     3,MILE3,MILES3     :REM*131
266Ø DATA 2,2,.ØØ1,MGS,MILLIGRA
     MS                 :REM*32
267Ø DATA 2,4,1E-6,MLS,MILLILIT
     ERS                :REM*114
268Ø DATA 2,1,.ØØ1,MMS,MILLIMET
     ERS                :REM*67
269Ø DATA 1,5,.ØØØ291,MINUTES
                        :REM*227
27ØØ DATA 2,2,28.349523,OZS,OUN
     CES                :REM*128
271Ø DATA 1,2,453.5923672,POUND
     S                  :REM*74
272Ø DATA 1,1,5.1,POLES:REM*12Ø
273Ø DATA 1,1,5.1,PERCHES
                        :REM*229
274Ø DATA 2,4,4.73176E-4,PTS,PI
     NTS                :REM*16Ø
275Ø DATA 1,4,8.8Ø95E-3,PECKS
                        :REM*172
276Ø DATA 1,1,3.Ø8527E16,PARSEC
     S                  :REM*185
277Ø DATA 1,1,.Ø762,PALMS
                        :REM*177
278Ø DATA 1,1, .762,PACES:REM*2
279Ø DATA 1,1,3.51E-4,POINTS
                        :REM*218
28ØØ DATA 2,4,9.46353E-4,QTS,QU
     ARTS               :REM*232
281Ø DATA 1,5,1.5767963,QUADRAN
     TS                 :REM*5Ø
282Ø DATA 1,5,1,RADIANS:REM*129
283Ø DATA 1,5,6.283185,REVOLUTI
     ONS                :REM*59
284Ø DATA 1,1,5.1,RODS :REM*148
285Ø DATA 1,3,26.Ø1,RODS2
                        :REM*124
286Ø DATA 2,5,4.84814E-6,SECS,S
     ECONDS             :REM*172
287Ø DATA 1,2,1.45939E4,SLUGS
                        :REM*99
288Ø DATA 1,2,635Ø.26,STONE
                        :REM*71
289Ø DATA 1,1,.2286,SPANS
                        :REM*188
29ØØ DATA 1,2,9Ø7184.744,TONS
                        :REM*222
291Ø DATA 1,3,15539928,TOWNSHIP
     S                  :REM*175
292Ø DATA 2,1,.9144,YDS,YARDS
                        :REM*11
293Ø DATA 4,3,.83612736,YD2,YDS
     2,YARD2,YARDS2     :REM*44
294Ø DATA 4,4,.764554858,YD3,YD
     S3,YARD3,YARDS3    :REM*2Ø7
295Ø DATA Ø             :REM*1Ø1
```


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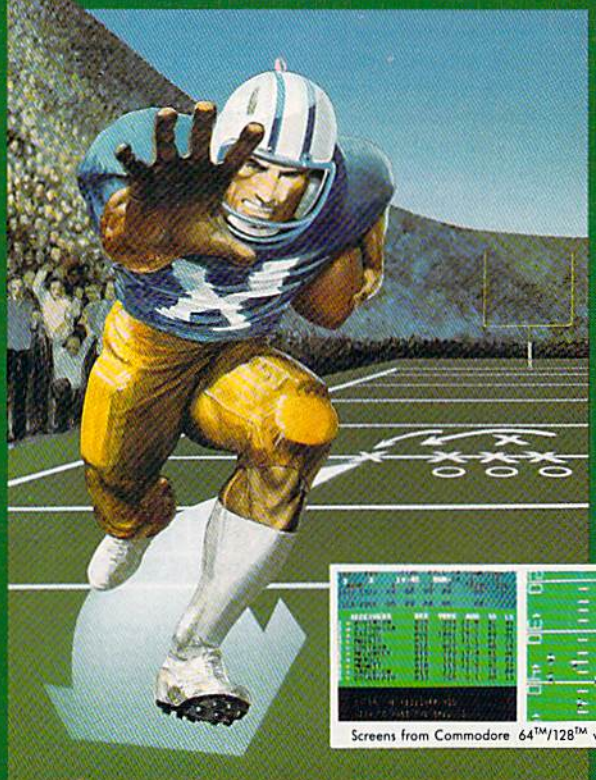

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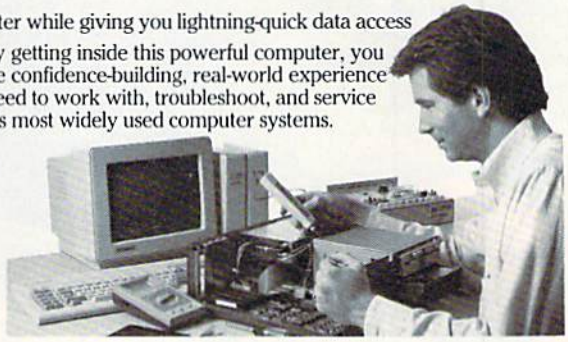

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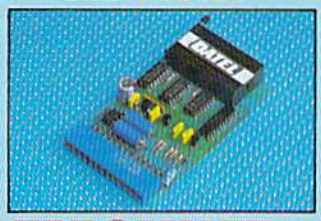

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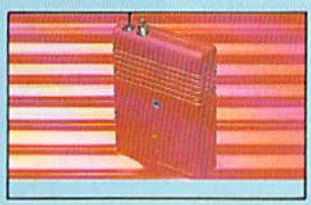

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Mystery Match

Combine the challenge of Concentration and Wheel of Fortune for double the fun.

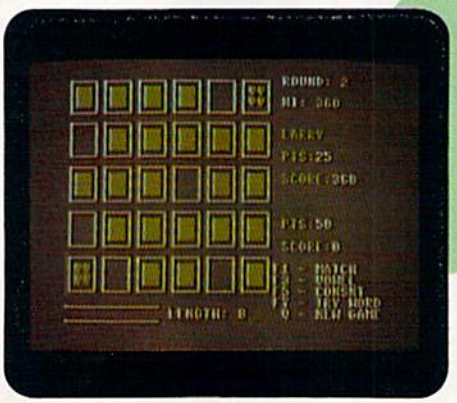
By JOHN RYAN

Concentration Station is a two-player educational game that tests memory as well as word recognition. It's instructional and fun for youngsters, and adults will enjoy its full sound effects, fast and challenging play and high-score keeping.

The rules of the game are simple: Each player tries to match random shapes hidden behind a six-by-five grid on the screen, and a successful match earns points. These points, in turn, are used to "buy" vowels and consonants in order to match a random mystery word. The first player to match the mystery word wins the round. Five rounds and 25 mystery words are built into the game, but both can be easily changed.

Type in Listing 1 and save it to disk under any filename, but don't run it yet. Now type in Listing 2, the machine language portion of Concentration Station, which is in the form of Data statements. Save it to the same disk as Listing 1 and then run it. After a few moments, the program will save a small binary file named CS+ to the disk. Now load and run Listing 1, which will, in turn, automatically load the machine language file. After all this is done, you'll only have to load Listing 1 whenever you want to play Concentration Station.

The game requires a joystick plugged into port 2. Both players share the joystick.



The playing grid for Concentration Station, showing a pair that match.

How To Play

After you've entered the names of both players, a grid appears on the screen, with the name of the active player highlighted to the right. Within the grid, hidden from view, are 15 pairs of shapes.

During a turn, a player may select any of the options in the menu at the bottom of the screen. To match shapes within the grid, press F1. Then use the joystick to move the flashing cursor anywhere within the grid, and press the fire-button to expose the shape in that location.

Finally, move the cursor to another square to select a second shape. If the two shapes match, you get 25 points and can continue your turn—again choosing any of the five options in the menu. If you didn't make a match, the other player's name appears and it's his or her turn.

Press F3 to buy a vowel you think may be in the mystery word, or F5 to buy a consonant. They cost ten and five points, respectively. Only AEIOU are considered vowels by Concentration Station; Y is a consonant.

After your purchase, you can enter the letter at the top of the screen, and, if it is in the mystery word, it'll appear the proper number of times in the word slot at the bottom of the screen. The length of the mystery word is displayed to the right of the word slot.

Once you think you know what the whole word is, press F7 to enter your guess—at a price of 25 points. If you're right, your remaining points are transferred to the score block and you receive a bonus of 250 points.

At the end of five rounds, a "game over" message appears, and the player with the highest score wins. If all the squares have been exposed and the mystery word still hasn't been guessed (or a player has run out of points for buying letters or guesses), you can restart the game, regardless of the current round, by pressing Q.

Customizing the Program

To decrease or increase the number of rounds per game, change the value of variable NR at the beginning of Listing 1. Variable NW reflects the number of mystery words in the Data statements in Listing 1. To add or remove words, change NW accordingly, type the new words into the Data statements and then resave the program. It's that easy; but be sure that NW equals the number of mystery words, or an Out of Data error may result. If more than 50 words are used, you'll also need to adjust the DIM statement upward. ►

RUN it right: **C-64; joystick**

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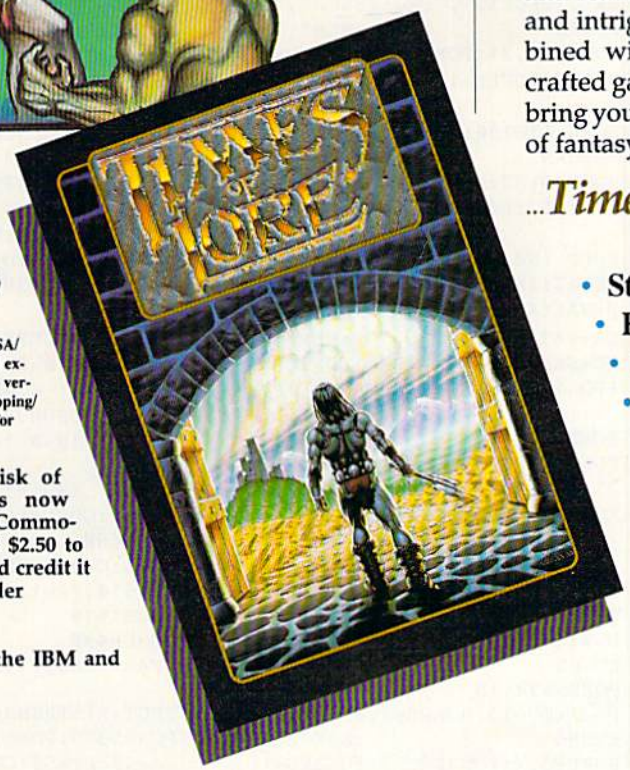

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ORIGIN

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The mystery words that you choose may contain as many as 11 letters. The collection of words that I've built into the program are appropriate for players of 12 years of age or more. For younger children, you'll probably find that they're less frustrated if you replace some of the more abstract words with easier ones.

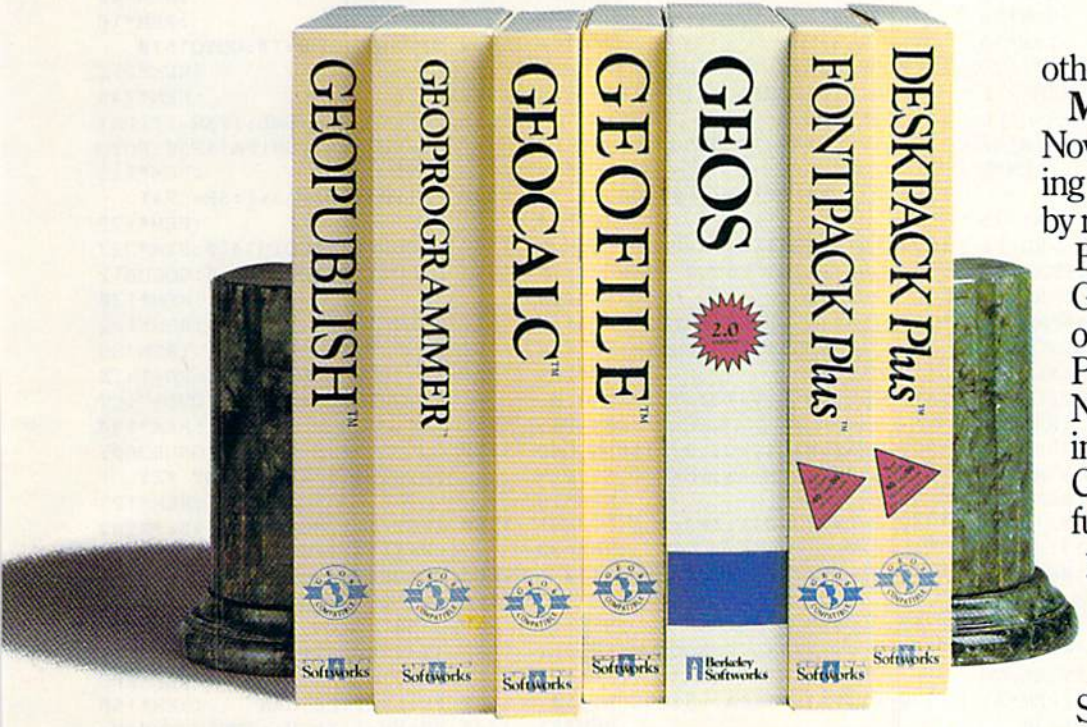
I've found, through my own children, that Concentration Station is excellent for teaching memory skills and spelling. With the incentive of competition and high-score keeping, this program offers young and old alike an entertaining diversion from the usual fare. R

John Ryan, who is one of RUN*'s contributing editors, is an air traffic control instructor and an advanced machine language programmer.*

Listing 1. Concentration Station program.

```
8Ø REM                          :REM*223
9Ø REM LISTING #1               :REM*143
95 REM                          :REM*238
1ØØ REM CONCENTRATION STATION (
    C) 1988 JOHN RYAN           :REM*38
11Ø IF FLAG=1 THEN 13Ø          :REM*71
12Ø IF FLAG=Ø THEN FLAG=1:LOAD"
    CS+",8,1                    :REM*49
13Ø POKE 51,Ø:POKE 52,48:POKE 5
    5,Ø:POKE 56,48:CLR          :REM*191
14Ø HI=Ø:ML=16384:CO=82Ø:POKECO
    ,2:SYSML:POKE821,Ø:RE=199
                                :REM*111
15Ø REM CHANGE WR$(5Ø) TO # OF
    WORDS                       :REM*245
16Ø DIM CN(15),CU(3Ø),WR$(25)
                                :REM*41
17Ø POKE53281,6:POKE5328Ø,6:PRI
    NTCHR$(147):PRINTCHR$(5)
                                :REM*196
18Ø R=3:C=3:GOSUB38Ø:PRINT"WELC
    OME TO CONCENTRATION STATIO
    N!":R=15:J=1                :REM*229
19Ø C=1:GOSUB38Ø:PRINT"ENTER PL
    AYER"J"NAME:";:INPUTNM$(J)
                                :REM*18
2ØØ NM$(J)=LEFT$(NM$(J),12)
                                :REM*238
21Ø R=R+1:J=J+1:IFJ<3THEN19Ø
                                :REM*39
22Ø SR(1)=Ø:SR(2)=Ø:RD=1
                                :REM*158
23Ø S=54272:SV=53248            :REM*227
24Ø FORA=1TO3Ø:CU(A)=Ø:NEXT
                                :REM*15Ø
25Ø PT(1)=Ø:PT(2)=Ø:TI$="ØØØØØØ
                                :REM*53
26Ø PA=1:CT=1:RESTORE           :REM*88
27Ø REM NW=# OF WORDS & NR= # O
    F ROUNDS                    :REM*228
28Ø NW=25:NR=5                  :REM*73
29Ø FORA=1TO15:READCN(A):NEXT:F
    ORA=1TO4:READMN$(A):NEXT
                                :REM*222
3ØØ FORA=1TONW:READWR$(A):NEXT
                                :REM*243
31Ø GOSUB6ØØ                    :REM*124
32Ø J=1:J1=Ø:X=RND(Ø)           :REM*12Ø
33Ø X=INT(RND(1)*3Ø)+1:IFCU(X)<
    >ØTHEN33Ø                   :REM*123
34Ø CU(X)=CN(J):J1=J1+1:IFJ1<>2
    THEN33Ø                     :REM*65
35Ø J=J+1:IFJ<>16THENJ1=Ø:GOTO3
    3Ø                          :REM*65
36Ø X=INT(RND(1)*NW)+1:WD$=WR$(
    X):LE=LEN(WD$):PRINTCHR$(14
    7)                          :REM*245
37Ø GOTO74Ø                     :REM*198
38Ø POKE781,R:POKE782,C:POKE783
    ,Ø:SYS6552Ø:POKERE,V:RETURN
                                :REM*17Ø
39Ø DATA65,81,83,87,88,9Ø,91,94
    ,1Ø2,1Ø5,1Ø8,113,1Ø7,126,12
    7                           :REM*164
4ØØ DATA"F1 - MATCH","F3 - VOWE
    L","F5 - CONSNT","F7 - TRY
    WORD                        :REM*213
41Ø DATA"BALLOON","BALONEY","BA
    RBARIAN","COMMERCE","COMMAN
    D                           :REM*2Ø
42Ø DATA"PRINCE","PRICE","PROCE
    ED","RESPECT","RESPONSE
                                :REM*133
43Ø DATA"RESTORE","RECKON","COM
    PUTER","MANAGER","MADMAN
                                :REM*178
44Ø DATA"MANHOOD","MANHOLE","ON
    ION","ONWARD","OPERATION
                                :REM*111
45Ø DATA"PROGRESSIVE","PROGRAMM
    ER","PROFIT","PROFESSOR","A
    PPLES"                      :REM*159
46Ø POKES+5,21:POKES+6,2Ø8:POKE
    S,14Ø:POKES+1,3:POKES+4,33
                                :REM*57
47Ø FORA=1TO15Ø:NEXT:POKES+4,Ø:
    RETURN                      :REM*143
48Ø POKEPO,32:POKEPO+1,32:POKEP
    O+4Ø,32:POKEPO+41,32:RETURN
                                :REM*57
49Ø POKE 198,Ø                  :REM*1Ø8
5ØØ GETA$:IFA$=""THEN5ØØ:REM*83
51Ø B=VAL(A$):RETURN            :REM*141
52Ø SA=947                      :REM*45
53Ø PO=SA+(CL*4-4)+(RW*16Ø):CO=
    (PO-1Ø24)+55296:RETURN
                                :REM*158
54Ø POKESV+21,1                 :REM*212
55Ø POKESV,SX:POKESV+1,SY:POKE8
    21,1:RETURN                 :REM*55
56Ø FORA=1TO7ØØ:NEXT:RETURN
                                :REM*13Ø
57Ø JV=PEEK(5632Ø)              :REM*217
58Ø JO=15-(JVAND15):FI=JVAND16:
    RETURN                      :REM*113
59Ø R=Ø:C=Ø:GOSUB38Ø:SYS599Ø3:R
    ETURN                       :REM*84
6ØØ POKES+24,15                 :REM*1Ø9
61Ø FORA=ØTO23:POKES+A,Ø:NEXT:R
    ETURN                       :REM*2Ø9
62Ø POKEPO,X:POKEPC,13:POKEPO+1
    ,X:POKEPC+1,13:POKEPO+4Ø,X:
    POKEPC+4Ø,13                :REM*228
63Ø POKEPO+41,X:POKEPC+41,13:RE
    TURN                        :REM*121
64Ø J=1:A=11Ø7:X=16Ø            :REM*1Ø1
65Ø FORPO=ATOA+2ØSTEP4:PC=55296
    +(PO-1Ø24):GOSUB62Ø:NEXT
                                :REM*11
66Ø A=A+16Ø:J=J+1:IFJ<>6THEN65Ø
                                :REM*164
67Ø RETURN                      :REM*47
68Ø IFPA=1THENV=1:GOTO7ØØ
                                :REM*142
69Ø V=Ø                         :REM*248
7ØØ R=6:C=27:PRINTCHR$(159):GOS
    UB38Ø:PRINTNM$(1)           :REM*239
71Ø IFPA=2THENV=1:GOTO73Ø
                                :REM*2Ø8
72Ø V=Ø                         :REM*3'
73Ø R=12:PRINTCHR$(158):GOSUB38
    Ø:PRINTNM$(2):RETURN
                                :REM*178
74Ø POKECO,Ø:SYSML:POKECO,1:SYS
    ML                          :REM*148
75Ø GOSUB64Ø:CT=Ø               :REM*146
76Ø R=1:C=27:V=Ø:GOSUB38Ø:PRINT
    "ROUND:":R=R+2:GOSUB38Ø:PRI
    NT"HI:":R=R+1               :REM*14Ø
77Ø J=1:PRINTCHR$(159)          :REM*9Ø
78Ø R=R+2:GOSUB38Ø:PRINTNM$(J):
    R=R+2:GOSUB38Ø:PRINT"PTS:":
    R=R+2:GOSUB38Ø              :REM*5
79Ø PRINT"SCORE:":PRINTCHR$(158
    ):J=J+1:IFJ<3THEN78Ø
                                :REM*129
8ØØ PRINTCHR$(5):R=17:C=26:GOSU
    B38Ø:FORA=1TO4              :REM*64
81Ø R=R+1:GOSUB38Ø:PRINTMN$(A):
    NEXT                        :REM*118
82Ø R=R+1:GOSUB38Ø:PRINT" Q - N
    EW GAME":R=21:C=2:GOSUB38Ø:
    PRINT"{11 COMD Ps}":REM*2Ø4
83Ø R=R+2:GOSUB38Ø:PRINT"{11 CO
    MD Ys}":R=R-1:C=C+12:GOSUB3
    8Ø                          :REM*123
84Ø PRINT"LENGTH:";LE:PRINTCHR$
    (19);:GOSUB68Ø:GOSUB17ØØ:GO
    SUB169Ø                     :REM*196
85Ø R=16:C=33:GOSUB38Ø:PA=2:GOS
    UB161Ø:PA=1:R=1Ø:GOSUB38Ø:G
    OSUB161Ø                    :REM*214
86Ø GOSUB49Ø                    :REM*185
87Ø IFA$<>CHR$(133)THEN9ØØ
                                :REM*55
88Ø IFCT=>15THEN86Ø             :REM*182
89Ø PC=55379:PO=11Ø7:CL=1:RL=1:
    SX=4Ø:SY=58:GOSUB98Ø:GOTO86
    Ø                           :REM*38
9ØØ IFA$<>CHR$(134)THEN92Ø
                                :REM*75 ►
```

IS YOUR FAMILY THIS WELL RELATED?



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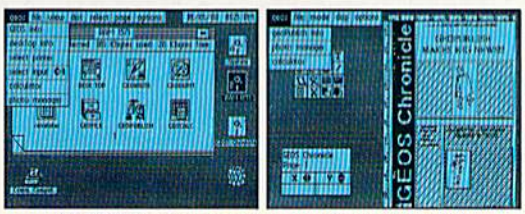

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```
91Ø GOSUB127Ø:GOTO86Ø  :REM*145
92Ø IFA$<>CHR$(135)THEN94Ø
                       :REM*181
93Ø GOSUB136Ø:GOTO86Ø  :REM*13Ø
94Ø IFA$<>CHR$(136)THEN96Ø
                       :REM*255
95Ø GOTO141Ø           :REM*247
96Ø IFA$<>"Q"THEN86Ø   :REM*5Ø
97Ø GOTO17Ø            :REM*28
98Ø GOSUB54Ø           :REM*33
99Ø TU=Ø:TP(1)=Ø:TP(2)=Ø:TA(1)=
    Ø:TA(2)=Ø          :REM*23Ø
1ØØØ GOSUB57Ø          :REM*66
1Ø1Ø IFFI=ØTHEN1Ø9Ø     :REM*42
1Ø2Ø IFJO=ØTHEN1ØØØ     :REM*5
1Ø3Ø FOR A=1 TO 5Ø:NEXTA
                       :REM*135
1Ø4Ø IFJO=1ANDRL<>1THENRL=RL-1:
    SY=SY-32:PO=PO-16Ø:REM*174
1Ø5Ø IFJO=2ANDRL<>5THENRL=RL+1:
    SY=SY+32:PO=PO+16Ø:REM*178
1Ø6Ø IFJO=8ANDCL<>6THENCL=CL+1:
    SX=SX+32:PO=PO+4   :REM*12
1Ø7Ø IFJO=4ANDCL<>1THENCL=CL-1:
    SX=SX-32:PO=PO-4   :REM*3Ø
1Ø8Ø PC=(PO-1Ø24)+55296:GOSUB55
    Ø:GOTO1ØØØ         :REM*237
1Ø9Ø TU=TU+1           :REM*173
11ØØ TP(TU)=(RL-1)*6+CL:TA(TU)=
    PO:TC(TU)=CU(TP(TU)):X=TC(
    TU)                :REM*142
111Ø IFTA(1)=TA(2)ORPEEK(PO)=32
    THENGOSUB46Ø:TU=TU-1:GOTO1
    ØØØ                :REM*23Ø
112Ø GOSUB62Ø:POKECO,6:SYSML:GO
    SUB61Ø             :REM*41
113Ø GOSUB57Ø:IFFI=ØTHEN113Ø
                       :REM*39
114Ø IFTU<>2THEN1ØØØ   :REM*213
115Ø IFTC(1)=TC(2)ANDTP(1)<>ØTH
    EN12ØØ             :REM*47
116Ø GOSUB56Ø:X=16Ø:POKECO,6
                       :REM*85
117Ø IFPA=1THENPA=2:GOSUB56Ø:GO
    SUB61Ø:SYSML:GOSUB68Ø:GOTO
    119Ø               :REM*94
118Ø PA=1:GOSUB56Ø:GOSUB54Ø:SYS
    ML:GOSUB68Ø        :REM*111
119Ø PO=TA(1):GOSUB62Ø:PO=TA(2)
    :GOSUB62Ø:POKESV+21,Ø:POKE
    821,Ø:RETURN       :REM*23
12ØØ X=32:POKE82Ø,3:SYSML:PT(PA
    )=PT(PA)+25:GOSUB119Ø:CT=C
    T+1                :REM*222
121Ø IFPA=1THENR=8:GOTO123Ø
                       :REM*134
122Ø R=14              :REM*218
123Ø PRINTCHR$(5):V=Ø:C=31:GOSU
    B38Ø               :REM*226
124Ø A$=STR$(PT(PA)):B$=MID$(A$
    ,2,3)              :REM*74
125Ø PRINTB$;:IFPT(PA)<1ØØTHENP
    RINT"{3 SPACEs}"   :REM*226
126Ø RETURN            :REM*127
127Ø IFPT(PA)<1ØTHENGOSUB46Ø:RE
    TURN               :REM*9Ø
128Ø PT(PA)=PT(PA)-1Ø:GOSUB121Ø
                       :REM*64
129Ø PRINTCHR$(5):R=Ø:C=Ø:GOSUB
    38Ø:PRINT"ENTER VOWEL";:IN
    PUTA$              :REM*2Ø4
13ØØ IFA$<>"A"ANDA$<>"E"ANDA$<>
    "I"ANDA$<>"O"ANDA$<>"U"THE
    N129Ø              :REM*21Ø
131Ø R=22:C=2:V=1:J=1:POKECO,Ø
                       :REM*215
132Ø IFA$=MID$(WD$,J,1)THENGOSU
    B38Ø:PRINTA$:POKECO,5:SYSM
    L                  :REM*19
133Ø C=C+1:J=J+1:IFJ<>LE+1THEN1
    32Ø                :REM*93
134Ø IFPEEK(CO)=ØTHENGOSUB46Ø
                       :REM*1Ø3
135Ø GOSUB59Ø:RETURN   :REM*18
136Ø IFPT(PA)<5THENGOSUB46Ø:RET
    URN                :REM*94
137Ø PT(PA)=PT(PA)-5:GOSUB121Ø
                       :REM*81
138Ø PRINTCHR$(5):R=Ø:C=Ø:GOSUB
    38Ø:PRINT"ENTER CONSONANT"
    ;:INPUTA$          :REM*138
139Ø IFA$="A"ORA$="E"ORA$="I"OR
    A$="O"ORA$="U"THEN138Ø
                       :REM*192
14ØØ GOSUB131Ø:RETURN  :REM*255
141Ø IFPT(PA)<25THENGOSUB46Ø:GO
    TO86Ø              :REM*194
142Ø PT(PA)=PT(PA)-25:GOSUB121Ø
                       :REM*189
143Ø PRINTCHR$(5):R=Ø:C=Ø:GOSUB
    38Ø:PRINT"ENTER WORD";:INP
    UTA$               :REM*2Ø3
144Ø IFA$=WD$THENV=1:R=22:C=2:G
    OSUB38Ø:V=Ø:PRINTWD$:GOTO1
    46Ø                :REM*136
145Ø GOSUB46Ø:GOSUB59Ø:GOTO86Ø
                       :REM*16Ø
146Ø POKECO,4:SYSML:SR=Ø
                       :REM*162
147Ø GOSUB59Ø          :REM*4Ø
148Ø GOSUB164Ø         :REM*16
149Ø IFPA=1THENR=1Ø:GOTO151Ø
                       :REM*212
15ØØ R=16              :REM*245
151Ø POKECO,5:SYSML:IFSR=PT(PA)
    THENSR(PA)=SR(PA)+25Ø:GOTO
    154Ø              :REM*112
152Ø SR(PA)=SR(PA)+1:SR=SR+1
                       :REM*179
153Ø GOSUB161Ø:GOTO148Ø:REM*227
154Ø GOSUB161Ø:PT(PA)=Ø:GOSUB12
    1Ø                 :REM*13Ø
155Ø GOSUB169Ø         :REM*122
156Ø GOSUB17ØØ         :REM*85
157Ø W$="ROUND OVER":RD=RD+1:IF
    RD>NRTHENW$="GAME OVER":CT
    =-1                :REM*19Ø
158Ø GOSUB59Ø:R=Ø:C=Ø:GOSUB38Ø:
    PRINTW$", PRESS ANY KEY
                       :REM*123
159Ø IFCT<>-1THENGOSUB49Ø:PRINT
    CHR$(147):GOTO23Ø  :REM*132
16ØØ GOSUB49Ø:GOTO17Ø  :REM*166
161Ø PRINTCHR$(5):V=Ø:C=33:GOSU
    B38Ø               :REM*72
162Ø A$=STR$(SR(PA)):B$=MID$(A$
    ,2,3)              :REM*2Ø3
163Ø PRINTB$:RETURN    :REM*158
164Ø VV=VV+1:IFVV>=2THENVV=Ø:V=
    Ø:GOTO166Ø          :REM*6
165Ø V=1               :REM*183
166Ø R=Ø:C=Ø:GOSUB38Ø  :REM*253
167Ø PRINTNM$(PA)" WINS!"
                       :REM*54
168Ø RETURN            :REM*25
169Ø R=1:C=33:V=Ø:GOSUB38Ø:PRIN
    TRD:RETURN         :REM*11Ø
17ØØ IFSR(PA)>HITHENHI=SR(PA)
                       :REM*158
171Ø R=3:C=3Ø:V=Ø:GOSUB38Ø:PRIN
    THI:RETURN         :REM*21Ø
```

Listing 2. Machine language portion of Concentration Station.

```
4 REM CONCENTRATION STATION - M
  L DATA               :REM*111
5 REM LISTING #2 - RUN THIS FIR
  ST TO                :REM*242
6 REM CREATE LOAD FILE FOR LIST
  ING #1               :REM*51
7 :                    :REM*65
1Ø PRINT CHR$(147):PRINT TAB(14
  )"PLEASE WAIT":I=16384
                       :REM*38
2Ø READA:IFA=256 THEN 4Ø:REM*79
3Ø POKE I,A:I=I+1:X=X+A:GOTO2Ø
                       :REM*1Ø9
4Ø IF X<>76226 THEN PRINT CHR$(
  19)TAB(8)"ERROR IN DATA STAT
  EMENTS":END          :REM*111
5Ø SYS 57812"CS+",8,1:POKE 193,
  Ø:POKE 194,64:POKE 174,2ØØ:P
  OKE 175,66           :REM*21
6Ø SYS 62957:PRINT" SAVE COMPLE
  TE. CHECK DRIVE FOR ERRORS":
  END                  :REM*235
7Ø DATA 173,52,3,2Ø8,6,32,181,6
  5,76,253,65,2Ø1,1,2Ø8,3,76,1
  29,65,2Ø1,2          :REM*125
8Ø DATA 2Ø8,3,76,1ØØ,64,2Ø1,3,2
  Ø8,3,76,127,64,2Ø1,4,2Ø8,3,7
  6,186,64,2Ø1,5       :REM*112
9Ø DATA 2Ø8,3,76,231,64,2Ø1,6,2
  Ø8,3,76,255,64,96,24,165,155
  ,1Ø9,167,2,133       :REM*182
1ØØ DATA 155,165,156,1Ø9,168,2,
  133,156,24,165,167,1Ø9,167,
  2,133,167,165        :REM*41
11Ø DATA 168,1Ø9,168,2,133,168,
  96,169,42,133,155,133,167,1
  69,4,133,156,169     :REM*229
12Ø DATA 216,133,168,96,12Ø,169
  ,113,141,2Ø,3,169,64,141,21
  ,3,88,96,173,53      :REM*153
13Ø DATA 3,24Ø,6,173,4,22Ø,141,
  39,2Ø8,76,49,234,32,3Ø,65,1
  69,15,141,24,212     :REM*252
14Ø DATA 169,Ø,141,5,212,169,14
  Ø,141,6,212,169,21,141,1,21
```

```
    2,141,4,212,16Ø     :REM*242
15Ø DATA Ø,14Ø,15,212,169,8,32,
    172,64,2ØØ,2Ø8,245,169,16,1
    41,4,212,96,141     :REM*165
16Ø DATA 199,66,162,Ø,2Ø2,2Ø8,2
    53,2Ø6,199,66,2Ø8,246,96,32
    ,3Ø,65,169,15       :REM*241
17Ø DATA 141,24,212,169,Ø,141,5
    ,212,169,14Ø,141,6,212,169,
    21,141,1,212,141    :REM*67
18Ø DATA 4,212,16Ø,255,14Ø,15,2
    12,169,8,32,172,64,136,2Ø8,
    245,169,16,141,4    :REM*147
19Ø DATA 212,96,169,Ø,141,12,21
    2,169,137,141,13,212,169,51
    ,141,8,212,141      :REM*241
2ØØ DATA 11,212,169,16,141,11,2
    12,96,169,Ø,141,19,212,169,
    137,141,2Ø,212      :REM*84
21Ø DATA 169,1,141,14,212,169,2
    44,141,15,212,169,129,141,1
    8,212,169,128       :REM*231
22Ø DATA 141,18,212,96,162,24,1
    69,Ø,157,Ø,212,2Ø2,2Ø8,25Ø,
    96,16Ø,Ø,169,94     :REM*2Ø8
23Ø DATA 145,155,32,124,65,2ØØ,
    169,95,145,155,32,124,65,19
    2,2,2Ø8,244,2ØØ     :REM*185
24Ø DATA 169,96,145,155,32,124,
    65,162,4,142,169,2,162,Ø,18
    9,177,65,168,169    :REM*221
25Ø DATA 97,145,155,32,124,65,2
    32,2Ø6,169,2,2Ø8,239,16Ø,12
    Ø,169,98,145,155    :REM*2ØØ
26Ø DATA 32,124,65,2ØØ,169,95,1
    45,155,32,124,65,192,122,2Ø
    8,244,2ØØ,169,99    :REM*233
27Ø DATA 145,155,32,124,65,96,1
    69,1,145,167,96,32,85,64,16
    9,5,141,171,2       :REM*5Ø
28Ø DATA 169,6,141,17Ø,2,169,4,
    141,167,2,169,Ø,141,168,2,3
    2,41,65,32,54,64    :REM*1ØØ
29Ø DATA 2Ø6,17Ø,2,2Ø8,245,169,
    136,141,167,2,32,54,64,2Ø6,
    171,2,2Ø8,217,96    :REM*251
3ØØ DATA 4Ø,43,8Ø,83,169,Ø,133,
    167,169,2Ø8,133,168,169,Ø,1
    33,169,169,48       :REM*115
31Ø DATA 133,17Ø,173,14,22Ø,41,
    254,141,14,22Ø,165,1,41,251
    ,133,1,162,8,16Ø    :REM*118
32Ø DATA Ø,177,167,145,169,2ØØ,
    2Ø8,249,32,73,66,2Ø2,2Ø8,24
    1,165,1,9,4,133     :REM*28
33Ø DATA 1,173,14,22Ø,9,1,141,1
    4,22Ø,173,24,2Ø8,41,24Ø,9,1
    2,141,24,2Ø8,96     :REM*175
34Ø DATA 169,87,133,155,169,66,
    133,156,169,24Ø,133,167,169
    ,5Ø,133,168,162     :REM*234
35Ø DATA 6,169,8,141,167,2,16Ø,
    Ø,14Ø,168,2,177,155,145,167
    ,2ØØ,192,8,2Ø8      :REM*89
36Ø DATA 247,32,54,64,2Ø2,2Ø8,2
    36,162,63,16Ø,Ø,185,135,66,
    153,64,3,2ØØ,2Ø2    :REM*145
37Ø DATA 2Ø8,246,169,13,141,248
    ,7,169,1,141,39,2Ø8,169,1,1
    41,29,2Ø8,141,23    :REM*184
38Ø DATA 2Ø8,96,24,165,168,1Ø5,
    1,133,168,165,17Ø,1Ø5,1,133
    ,17Ø,96,Ø,Ø,Ø,31    :REM*6Ø
39Ø DATA 31,24,24,24,Ø,Ø,Ø,255,
    255,Ø,Ø,Ø,Ø,Ø,Ø,248,248,24,
    24,24,24,24,24      :REM*178
4ØØ DATA 24,24,24,24,24,24,24,2
    4,31,31,Ø,Ø,Ø,24,24,24,248,
    248,Ø,Ø,Ø,255       :REM*165
41Ø DATA 255,Ø,128,1,Ø,128,1,Ø,
    128,1,Ø,128,1,Ø,128,1,Ø,128
    ,1,Ø,128,1,Ø,128    :REM*158
42Ø DATA 1,Ø,128,1,Ø,128,1,Ø,12
    8,1,Ø,128,1,Ø,128,1,Ø,128,1
    ,Ø,255,255,Ø,Ø,Ø    :REM*17Ø
43Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,
    Ø,Ø,235,Ø,256       :REM*184
```


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TELECOMPUTING WORKSHOP

Running your own BBS: The ins and outs and what abouts of SYSOPing.

By LOREN LOVHAUG

RECENTLY, I SAT DOWN TO READ the bundle of mail this column has generated. I took careful notes on the comments made and the questions asked, and was astonished to find that the most frequent inquiry concerned readers going online with their own bulletin board systems. So, since this seems to be the major interest of many readers, I'll discuss the ins and outs of becoming a Commodore bulletin board system operator (SYSOP).

The first decision you must make as a prospective SYSOP involves the focus of your BBS. The designations and characteristics of the four basic types of BBSs are shown in Table 1.

Each of these types has its own hardware and software requirements. The amount of hardware, especially disk storage, that you'll need to run your BBS is usually dictated by two factors: the particular software you choose and your financial resources.

For the categories below, I've given what I feel are the absolute minimum requirements for each basic type of system. Keep that in mind, and also remember that in most cases, especially with disk storage, more is better if you can afford it.

THE SMALL, PRIVATE BBS

The small, private BBS is designed to cater to a limited user community, generally numbering less than 50. The phone number in such cases is generally not publicly disclosed.

In some ways, you can look at this type of system as little more than a sophisticated electronic mailbox. It's usually run by small companies in lieu of answering machines or "While You Were Out" phone slips, or by people on conflicting schedules who want to stay in touch or quickly share information.

In this particular situation, your hardware requirements are likely to be modest—a C-64 or 128, at least one disk drive and a 300/1200-baud modem. A small, personal BBS is the only type that doesn't need a separate phone line and a dedicated computer, although it may be advisable, as you'll see below.

A private BBS, unlike its public cousin, can be run on a part-time basis and generally doesn't require much maintenance. The software requirements for such a system are also less extensive. A commercial or public domain bulletin board program that provides the capability to post public and private messages or electronic mail (E-mail) is usually adequate for a private BBS application.

If you want it to be able to share programs or long documents, some kind of upload/download facility that supports at least one file-transfer protocal is necessary. In this respect, the mini-BBS options that you can find in some commercial terminal packages might be adequate.

THE PUBLIC BBS

The three remaining types of BBSs are public in nature. In theory, this means that you're publicly circulating the phone number and inviting members of the general public to use your BBS. Such a system often requires much more disk storage, as well as a dedicated computer and phone line.

Many prospective SYSOPs begin operating with the notion that they can run a part-time public BBS using just their personal phone line and the C-64 or C-128 they use for many other purposes. However, they usually soon realize that it really can't be done, and in most cases they end up with a second phone line and a dedicated computer running 24 hours a day.

For example: Suppose you set out to run a part-time public BBS, available for use while you're at work between the hours of 8 AM and 6 PM. You figure that while you're at work, you won't be using your computer or telephone, so they're free to be used with your BBS. Ideally, you can then have full use of both when you arrive home after 6 PM. Unfortunately, you would probably find that it doesn't work that way.

Although you may declare that your BBS is open only during certain hours, there's nothing to prevent the rest of the world from calling it at any time, day or night. After a few evenings of constantly answering your one phone, only to hear the unpleasant sound of a modem carrier, I guarantee you'll be convinced that a second phone line is the way to go.

The reasons a dedicated computer is a must in the case of a public BBS have to do with convenience, both for you and the people who access your system. BBS programs tend to be large, often taking a long time to load and configure, primarily because most of them are designed to be loaded, run and left running. The more reloading and reconfiguring you do, the more opportunities there are for data corruption and mistakes on your part.

After a while, it becomes a real hassle to take the BBS down just to get your nightly "fix" of your favorite arcade game or to work on outside interests, and then reload and reconfigure the BBS. Also, a certain amount of that in- ►

Table 1. BBS types and characteristics.

Type	Characteristics
Small, Private BBS	Small number of users; limited functions
Public Message-Base BBS	A public arena for discussion and information
Public Download BBS	A distribution outlet for text and programs
Public General-Purpose BBS	Stresses both message base and downloads

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convenience and frustration gets passed on to the BBS's users. The more you use your computer for purposes other than the BBS, the more busy signals users get, and the fewer their opportunities to access your system. They could very well get fed up and stop calling.

The number-one killer of any public BBS is loneliness. Nothing causes a SYSOP to lose interest faster than running a BBS that no one calls. The key to ensuring an enjoyable SYSOPing experience is to make certain your system attracts a variety of callers and doesn't discourage them from coming back. These "regulars" are the staple of any successful public BBS.

The Message-Base BBS

Lively discussions attract and keep users accessing a message-base BBS. When you're evaluating which program to choose for your message-base system, look for one that features an online message and text editor that has enough sophistication for messages to be easily entered, edited and formatted. It should also be easy and intuitive to operate, so that it enhances, rather than inhibits, the writing process.

Another characteristic to look for is the ability to categorize or separate messages by their specific topics. This makes it much easier to maintain concentration on a discussion's theme, and it encourages replies to be kept within the particular focus. It's also important to have enough disk storage so that various topics can be discussed without seriously restricting the length and number of replies.

The Download BBS

With a download-oriented BBS, disk capacity becomes an even greater priority. The key here is to have a large library of programs and information available for downloading. If you're thinking about running a public download BBS, I strongly urge you to consider some of the larger capacity disk drives.

There are the old one-megabyte (quad-density) Commodore SFD-1001 or PET 8250 disk units or the newer 1581, with 808K. Or, if you have a great deal of enthusiasm and disposable income, you can get a hard drive, like Xetec's Lt. Kernal or ICT's Mini Chief. Always make certain that the BBS software you choose supports your particular drive(s).

Another software consideration for a download BBS is file-transfer protocol support. At a bare minimum, your software should be supportive of at least the Punter C1 and the standard Xmodem protocols.

Also particularly attractive for a download-oriented BBS is a protocol offering batch-transfer options that enable users to upload and download multiple files in an automated sequence. This frees the user from having to "baby-sit" his computer during the file-transfer session so that he's ready to start a new file transfer after each one is completed.

You might want to look for software that provides for limiting the number of downloads, or that rewards people with more download time when they upload files to your BBS. Download-oriented BBSs tend to become monopolized by users who frequently download but rarely upload.

The General-Purpose BBS

In the case of general-purpose BBSs, all of the considerations mentioned above for both message-base and download BBSs apply.

In Conclusion

Finally, regardless of what kind of BBS you want to run, when you're choosing your BBS hardware and software configurations, try to put together a system that fits your particular level of interest and the amount of time you want to commit to SYSOPing.

If you're clearly the type of person who wants to run a BBS, and yet don't have the time or desire to do a great deal of daily maintenance, try to put together a system that has enough disk storage or the ability to automatically free up disk space so that the system can operate with a minimum amount of SYSOP involvement.

On the other hand, if you're someone who likes to tinker, who might enjoy spending time modifying your BBS, look for a system that's very flexible, perhaps even user-programmable, thereby providing enough diversity so you can continually modify and tailor the BBS to your liking. ■

Loren Lovhaug, a programmer and writer with lots of telecommunications experience, is SYSOP of Q-Link's C-128 Special Interest Group and co-SYSOP of GEnie's Commodore Flagship. You can write to him care of:

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You can also send him electronic mail on QuantumLink (LOVHAUG) or GEnie (Sparrow.J).

GEOWATCH

Jumpin' GEOSephat! Berkeley Softworks' GEOS 2.0 addresses many of the shortcomings of previous versions.

By LOREN LOVHAUG

PERHAPS NO SINGLE PIECE of hardware or software for the Commodore 64 or 128 has received more attention, sparked more controversy, inspired more praise and aroused more consternation than GEOS. And now, thrust into this fray, we have GEOS 2.0, which will likely spur even more examination and debate.

After using GEOS 2.0, I'm pleased to report that many of the weaknesses of GEOS and GEOS 128 have been at least partially addressed by Berkeley. Let's take a look...

The Second Coming of GEOS

GEOS 2.0 runs on a C-64 or a C-128 in 64 mode and requires at least one Commodore 5¼-inch disk drive, such as the 1541 or 1571, a box of blank disks, some kind of video display device, and, at the very least, a joystick to serve as an input device. Although it's not listed as necessary, there's very little you can do with GEOS without a dot matrix printer capable of at least 80-dots-per-inch resolution. I also find using GEOS intolerable without a 1351 mouse and either a RAM expansion unit, a second disk drive, or both.

The package contains a 300-page manual and three disks that together provide all the following: the GEOS Kernal and deskTop; significantly enhanced versions of geoPaint and geoWrite (version 2.1); geoMerge; geoLaser; the Text Grabber; geoSpell; a special paint driver application; numerous input and printer drivers; and a GEOS demo program.

One striking improvement over previous versions of GEOS is the manual, which is the best one Berkeley has ever produced! It's an excellent operations guide and reference tool, complete with a table of contents, glossary of terms, index, four appendices, numerous illustrations and screen shots, and exhaustive tutorials that do a good job of explaining how to use the applications programs. Sections on copy protection and installation procedures that used to be particularly troublesome are now much easier to follow. However, the procedures themselves have not really changed, and they require careful study *before* you set out to use GEOS 2.0.

The Desktop

The heart and soul of GEOS is the deskTop, so it's no surprise that you find the most significant improvements there. The changes were visually apparent as soon as I booted GEOS 2.0. The top line of the deskTop screen is now almost totally covered with seven pull-down menus on the right and a constantly updated date and clock display on the upper right.

I'm particularly fond of this date and clock display. Besides providing the time and date information, it also serves as the medium for time and date stamping of files. In previous implementations of GEOS, it was necessary to load the Preference Manager, set the time and date, and then wait until you were returned to the deskTop. Now all you need to do is click on the clock display with the mouse and type the new date and time.

The seven pull-down command menus on the deskTop are GEOS, File, View, Disk, Select, Page and Options. The **GEOS menu** is unchanged from previous versions and still provides the means for selecting your printer and input devices, as well as executing various desk accessories, such as the Photo and Text Managers, the Calculator, the Alarm Clock, the Notepad, the Pad Color Manager and the Preference Manager.

The Alarm Clock and Preference Manager haven't been changed, either. However, the Photo and Text Managers, Calculator and Notepad have all been enhanced. The Photo and Text Managers can now be used to name and rename photo and text scraps, as well as to search for and select scraps by either typing a specific scrap name or clicking on the name you want in the list of scraps in an album. This name-and-search facility eliminates the tedium of manually scrolling through large photo or text albums to find a specific scrap.

The Calculator can now copy values to a text scrap for pasting into geoWrite, as can the Notepad. You can also easily append and delete pages with the Notepad. Although these enhancements transform the Calculator and Notepad into useful features, one major snafu still remains: They're activated by keyboard sequences only, as opposed to pull-down menus or a choice of either. This means you must memorize the keystroke commands or constantly refer to the manual, which seems incongruous with the intent of GEOS.

A new desk accessory, the Pad Color Manager, lets you assign a different color to each kind of system icon, thereby making it easier to distinguish icons that denote different kinds of files, such as printer drivers and applications data.

The **File menu** contains seven entries that facilitate basic file manipulation, including Open, Duplicate, Rename, Info, Print, Delete and Undo Delete. The only item of particular interest in this group is the new Undo Delete function, for recovering files that have been deleted with the Delete option or have been placed in the Wastebasket.

All of these file manipulation entries have keyboard equivalents, which I'm sure will make mousiephobes happy. Unfortunately, not all of the equivalents are mnemonic in nature, which makes them more difficult to learn and remember. For instance, holding down the Commodore key and pressing H to duplicate a file or M to rename a file doesn't make much sense.

The **View menu** hasn't changed from previous versions of GEOS, as it still enables you to display files as icons or as text sorted by size, type, creation date or name. It would have been nice if Berkeley had added the ability to click and double-click on items listed as text, rather than just icons. Without that capability, viewing file data in any format other than icons is virtually useless.

The **Disk menu** is used to perform the GEOS equivalents of standard Commodore DOS operations. As with the File menu, keyboard equivalents are provided, but here, fortunately, the equivalents are for the most part mnemonic. ►

The **Select menu** is a brand-new feature that lets you select (highlight, as if clicked on) various subsets of files on a disk for use with the new Multifile (batch) option (see below). Using this menu, you can select all the files on a disk, all the files on a particular disk Notepad page or all the files whose icons have been placed in the border area. These options also have keyboard equivalents, but again no mnemonic relationship exists between the operation and the keystroke.

The **Page menu**, also new, is a valuable addition for those who like to organize the layout of their GEOS disks in a specific manner. The Append option adds a new blank disk Notepad page at any point in the page sequence, while the Delete option does the exact opposite, removing the page (and any files on it). Commodore/S and Commodore/T are provided as keyboard equivalents—so much for mnemonics.

The **Options menu** provides three necessary functions and one redundant one. The first entry, Set Clock, isn't necessary because just a few pixels to the right lies the new clock display, which can just as easily be clicked on for setting purposes. The other entries let you reset the system (reinitialize), exit to Basic and display miscellaneous keyboard shortcuts. I found this shortcut help screen a particularly useful addition. In fact, I recommend that Berkeley add such options to all their GEOS applications having keyboard shortcuts.

Subtle deskTop Changes

The most important changes to the deskTop are more subtle, having to do with disk and file management. To begin with, GEOS now supports *three* logical drives, in any combination of 1541, 1571 and 1581 disk drives and RAM expansion units (REUs). All the drives are supported to their maximum storage capacity.

Although the third logical drive is the answer to many GEOS users' prayers, I must report that the implementation is clumsy. You see, only two logical drives are actually available at any time. To use the third, you must drag its disk icon over one of the first two, which has the effect of swapping units. The icon that was in one of the first slots then goes to the inactive position. This "shell game" is ridiculous, especially when only a little more effort could have made all three drives available, with the user just clicking on (highlighting) the particular drives desired for a particular operation.

The **Configure utility** provides a way to assign default definitions for logical drives A, B and C, and to reassign or add equipment. For example, suppose you have a 1571 disk drive, two 1581s and an REU attached to your computer. For power-up, the 1571 must be logical unit A (the boot drive), since GEOS must boot from a 5¼-inch disk. However, after power-up, it's desirable for speed and storage reasons to use your REU and the two 1581s. With the Configure utility, all you need to do is click the proper settings and your maximized configuration is complete.

Another powerful aspect of the Configure utility concerns RAM expansion. Two RAM disk configurations are supported under GEOS, depending on the size of your REU. A 1541 RAM disk (1764 or 1750 REU) can hold 170K, while a 1571 RAM disk (1750 REU) can hold 336K. Since neither of these configurations uses up all the memory in its respective REU, GEOS 2.0 can use the remaining memory in a variety of ways. One is as a system cache for screen data. This feature, which is activated by clicking on the DMA (Direct Memory Access) for the Movedata option in the Configure utility, speeds screen operations such as scrolling the Edit window in geoPaint and displaying or erasing requestors. You can also use the Configure utility to turn your REU into a disk drive cache to speed up operation of one of your physical drives, and even to restart GEOS, should you need to execute a non-GEOS application and then return.

The last major improvement to the deskTop as far as disk management is concerned is **Multifile (batch) processing** in file operations. Under previous versions of GEOS, operations such as file copying or deletion had to be done one file at a time, but now you can select several files to be processed as a group. The selection process can be done manually or automatically, using the options under the Select menu.

Interestingly enough, the primary method of manual selection is via the keyboard—once again conflicting with the point-and-click nature of GEOS and its goal of intuitive operation. You select files manually in Multifile operations by holding down the Commodore key and pressing a number from 1 to 8, the numbers denoting the position of the file you want to select on the deskTop Notepad. Or, you can select files by holding down the Commodore key and pressing the button on the input device pointed to the desired file.

I have one other Multifile nit-pick, which involves the automatic selection of files. When using the Select All Pages entry under the deskTop's Select menu, you must sit and watch as GEOS displays the first disk Notepad page to the last, highlighting the individual files. To save all that display time, this operation probably should have been handled internally, out of sight of the user.

geoPaint

For me, the best reason for using GEOS has always been geoPaint, and the version packaged with GEOS 2.0 is even more competent than its predecessors. The first improvement I noticed is that nearly all the rendering tools now seem to work 10–20 percent faster than before. The increase in performance is particularly noteworthy when it comes to drawing solid (filled) objects.

In addition to their increased speed, the accuracy of the rendering tools has improved as well. When using any rendering tool, such as the line-draw tool, you can now precisely adjust the position of your pixel cursor with the cursor keys. For the casual geoPainter, this may not seem like such a monumental improvement, but anyone who's spent what seemed like hours gingerly coaxing a mouse or joystick into that "just right" position will immediately grasp what kind of relief such an option brings. Best of all, this feature can be used in Post Normal and Pixel Edit modes. Precision has never been this easy!

Also improving the placement accuracy of the rendering tools is geoPaint's new **Constrain option**. Selected by clicking the Constrain box in the Measurement window, it restricts the change in direction of pixel cursor movement to an angle of 45 degrees to the previous line. In other words, this option limits drawing to directions analogous to north, northeast, east, southeast, south, southwest, west and northwest, making it much easier to create forms such as pseudo three-dimensional images.

Another area where geoPaint's speed and accuracy have been improved is in the repositioning and resizing of edit boxes. Unlike previous versions of geoPaint, you now move repositioning guides, representing the upper-left and lower-right corners of the selected area, until the position is correct. Only then is the bitmapped region redrawn. This saves considerable time and makes geoPaint much more responsive to fine alignment adjustments.

The new and improved version of geoPaint also lets you resize your edit box with the resizing gadget in the lower-right corner of the box. Just use

your input device to drag this gadget in any direction, and your edit box will change accordingly.

That art-class standard, grid lining, has also been added to geoPaint's arsenal. You can now turn on preset grid lines, spaced one printed inch (80 screen pixels) apart both horizontally and vertically, to help lay out your work. The grid lines are useful, but I wish I could define my own space intervals. I also wish these grid lines weren't confined to the current edit window. If you want the lines to span the entire page, it's easy enough to turn them on every time you enter an edit window, but it would have been nice if automatic full-page grid lining were at least an option.

My final complaint here is that the grid lines are destructive in a way. That is, if you ask geoPaint to remove the grid lines from your current edit window, it will also erase any pixels that are turned on beneath the lines. The result looks rather like the tan lines sunbathers get at the edge of their clothing.

The two most impressive enhancements to geoPaint are its new Pattern and Scaling options. When you're filling patterns or airbrushing, four new options make it possible to soften or intensify the patterns, and even to create the illusion of transparency. Although it takes a great deal of practice, plus insight into how such effects are best used, these Pattern modes open up a great deal of potential.

Even more exciting is geoPaint's new ability to scale, stretch and even smooth photo scraps. These options are difficult to describe, other than to say that they let you custom-fit pictures and enhance their appearance through some very nice smoothing algorithms. One particularly attractive application for this feature is blowing up font and picture data together to create titles and mastheads.

GEOWRITE & COMPANY

The rest of the GEOS 2.0 package basically comprises geoWrite and associated utilities. GeoWrite has always been the weakest link in the GEOS chain, and it remains so, although geoMerge, geoSpell, geoLaser and Berkeley's Paint Overlay drivers are excellent. The "new" versions of geoWrite and the utilities really aren't new at all, having been marketed before as part of Writer's Workshop and geoWrite Workshop, or as add-on packages. For a more detailed examination of this version of geoWrite, refer to Marte Brengle's geoWatch columns in the August and September 1988 issues of *RUN*.

SHOULD YOU BUY IT?

In spite of its weaknesses, I consider GEOS 2.0 an excellent value. For under $70, you get a lot, especially if you're interested in graphics or text and graphics integration. I also strongly recommend that current GEOS owners spend the $25 to upgrade. The improvements to the deskTop and geoPaint are definitely worth it. ■

Loren Lovhaug, RUN's Telecomputing Workshop columnist, temporarily dons a different hat to do this review for geoWatch.

RUN's Checksum

TYPE IN *RUN*'s CHECKSUM, which serves for both the C-64 and for the C-128 in either 40- or 80-Column mode, and save it to disk before running. When typing in a program from *RUN*, first load and run *RUN*'s Checksum. The screen will display a SYS number that deactivates and reactivates the Checksum. Always disable *RUN*'s Checksum before attempting to run another program. Note: You can abbreviate Basic keywords; spaces affect the checksum only when within quotes; and the order of characters affects the checksum.

With this new version, when you press return after typing in a program line, a one-, two-, or three-digit number from 0 to 255 appears in the home position. If this number matches the checksum value in the program listing, the line is correct. If the number that appears *doesn't* match the checksum value, compare the line with the magazine listing to find your error. Then move the cursor back up to the line and make your corrections. Now, after you press return, the correct checksum value should appear. Continue entering the listing until all the lines have been correctly typed. Then deactivate *RUN*'s Checksum, using the SYS number. Save the finished program.

All the graphics and control characters in the listings in *RUN* have been translated into understandable key combinations. They are the instructions you see inside the curly braces. For example, {SHIFT L} means you hold down the shift key while you press the L key. You do *not* type in the curly braces. What appears on the screen will look quite different from what is designated inside the braces. Here are some more examples:

{22 SPACEs}—press the space bar 22 times

{SHIFT CLR}—hold down the shift key and press the clr-home key

{2 CRSR DNs}—press the cursor-down key twice

{CTRL 1}—hold down the control key and press the 1 key

{COMD T}—hold down the Commodore logo key and press the T key

{FUNCT 1}—press the F1 key

{5 LB.s}—press the British pound key (*not* #) five times R

Listing 1. *RUN*'s Checksum program. This program is available on *RUN*'s BBS for users to download.

```
10 REM RUN'S CHECKSUM 64/128 - BOB KODADEK
20 MO=128:SA=3328:IF PEEK(40960)THEN MO=64:SA=4
   9152
30 FOR I=0TO169:READB:CK=CK+B:POKE SA+I,B:NEXT
40 IFCK<>20651 THENPRINT"DATA ERROR!":END
50 POKESA+110,240:POKESA+111,38:POKESA+140,234
60 PRINTCHR$(147)STR$(MO)" RUN CHECKSUM":PRINT
70 PRINT"TO TOGGLE ON OR OFF, SYS"SA:IF MO=128
   THEN 100
80 POKESA+13,124:POKESA+15,165:POKESA+25,124:PO
   KESA+26,165
90 POKESA+39,20:POKESA+41,21:POKESA+123,205:POK
   ESA+124,189
100 POKESA+4,INT(SA/256):SYS SA:NEW
110 DATA 120,162,24,160,13,173,4,3,201,24,208,4
    ,162,13,160,67,142,4,3,140
120 DATA 5,3,88,96,32,13,67,152,72,169,0,141,0,
    255,133,176,133,180,166,22
130 DATA 164,23,134,167,132,168,170,189,0,2,240
    ,58,201,48,144,7,201,58,176
140 DATA 3,232,208,240,189,0,2,240,42,201,32,20
    8,4,164,180,240,31,201,34
150 DATA 208,6,165,180,73,1,133,180,230,176,164
    ,176,165,167,24,125,0,2,133
160 DATA 167,165,168,105,0,133,168,136,208,239,
    232,208,209,169,42,32,210
170 DATA 255,165,167,69,168,170,169,0,32,50,142
    ,169,32,32,210,255,32,210
180 DATA 255,169,13,32,210,255,104,168,96,104,1
    70,24,32,240,255,104,168
190 DATA 96,56,32,240,255,138,72,152,72,24,162,
    0,160,0,32,240,255,169
200 DATA 42,208,198
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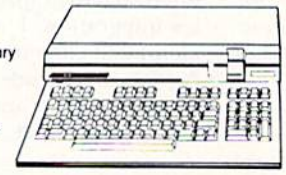

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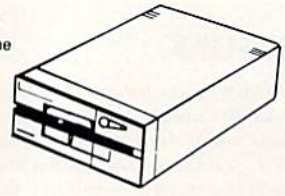

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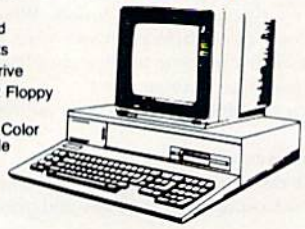

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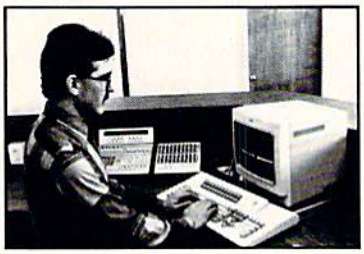

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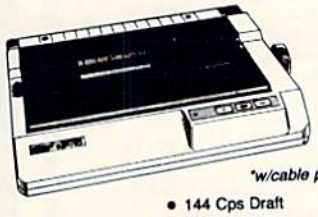

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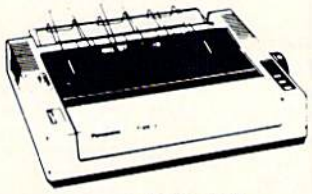

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Almost all modems (and services) are set up to communicate in one or more of three speeds; 300, 1200 and 2400 Baud. Most computer users prefer 1200 Baud. (1200 Baud is about 4 times as fast as 300 which means you spend about ¼ the time and money getting the data you want and more time enjoying it.)

2400's are great (but quite expensive). Most users can't justify the cost difference unless they do a large amount of modem work with a service that can handle 2400 baud.

You will also notice a few very cheap 1200s on the market at "too good to be true prices." They are. The reason is that they are usually foreign built and not truly Hayes® and Commodore 1670® compatible therefore not usable in all situations and with all services.

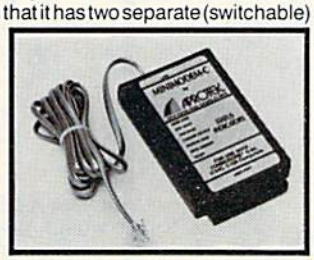
What is Hayes® compatibility? It's the industry standard and about all modem manufacturers have adopted the "AT" (Hayes) command set. Beware of those who don't. Virtually all software being written now uses Hayes commands. Be sure the modem you buy is truly Hayes® and Commodore 1670® compatible therefore usable in all situations and with all services.

Let's compare Minimodem-C™ with the 1670® , Avatex-e and Volks 6480®

Comparison of	Minimodem-C™ vs.	1670® vs.	Avatex-e	Volks vs. 6480®
Hayes® Compatibility?	100%	Subset Only	Subset Only	None
Commodore direct Connect?	Yes	Yes	No	Yes
Number of Status Indicators	7	0	8	0
Busy Detect?	Yes	No	No	No
DTR Signal Support?	Yes	No	Yes	No
High Speed Detect Line?	Yes	No	No	No
Number of DIP Switches	8	3	8	0
Number of Status Registers	16	3	16	0
Guarantee	1 yr.	90 days	2 yrs.	5 yrs.

Now you have the FACTS to make an informed decision.

What do you get for $74.95? Everything! You don't need to worry about cables, compatibility or anything else! The Aprotek Minimodem-C™ plugs directly into your Commodore C-64, C-64C or C-128 USER port. It is unique in that it has two separate (switchable) emulation modes (Hayes and Commodore 1670®) to make it compatible with ALL available software. The Minimodem-C™ is a full feature, 300/1200 Baud modem with Auto Answer, Auto Dial, Touch-Tone or rotary dialing, has status indicators and a built-in speaker. Just plug it into your computer and standard phone jack with the attached cable. Minimodem-C™ is supplied with "Multiterm" 64 and 128, and a free trial subscription to Compuserve.



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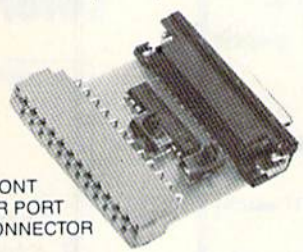

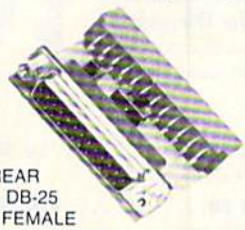

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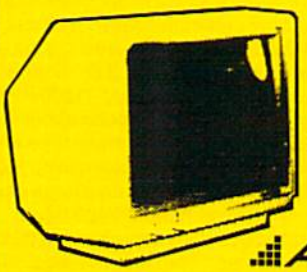

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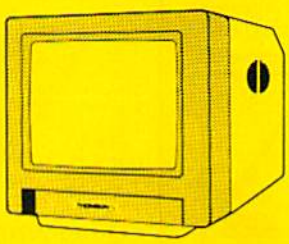

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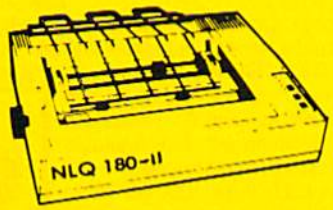

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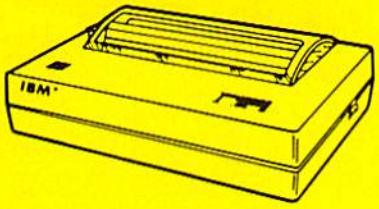

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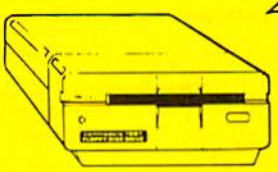

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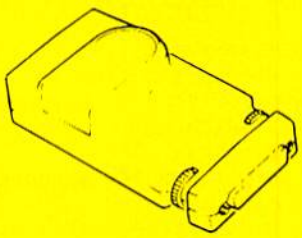

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HAIL TO THE CHIEF

From p. 47.

```
225Ø IF A$=CHR$(136) THEN AN=3:
     GOTO 23ØØ          :REM*165
226Ø IF A$="{CRSR RT}" THEN P=P
     +1:GOSUB 24ØØ:IF P=3 THEN
     P=Ø                :REM*152
227Ø IF A$="{CRSR DN}" THEN P=P
     -1:GOSUB 24ØØ:IF P=-1 THEN
      P=2               :REM*144
228Ø POKE V+6,X(P)      :REM*226
229Ø GOTO 221Ø          :REM*37
23ØØ RETURN             :REM*131
231Ø REM SOUND 1        :REM*225
232Ø FOR TT=Ø TO 24:POKE S+TT,Ø
     :NEXT              :REM*238
233Ø POKE S+1,13        :REM*144
234Ø POKE S+5,1ØØ       :REM*23
2345 POKE S+15,3Ø       :REM*12
2346 POKE S+24,15       :REM*42
2347 POKE S+4,21        :REM*133
2349 RETURN             :REM*178
24ØØ REM SOUND 2        :REM*67
242Ø FOR TT=Ø TO 24:POKE S+TT,Ø
     :NEXT              :REM*75
243Ø POKE S+1,13Ø       :REM*118
244Ø POKE S+5,9         :REM*198
245Ø POKE S+15,3Ø       :REM*149
246Ø POKE S+24,15       :REM*184
247Ø POKE S+4,21         :REM*1
248Ø FOR TT=1 TO 2ØØ:NEXT:POKE
     S+4,2Ø             :REM*176
249Ø RETURN             :REM*66
2491 REM SOUND 3        :REM*165
2492 POKE S+24,Ø:FOR TT=Ø TO 23
     :POKE S+TT,Ø:NEXT  :REM*14
2493 POKE S+1,13Ø:POKE S+5,9
                        :REM*162
2494 POKE S+15,3Ø:POKE S+6,32
                        :REM*94
2495 POKE S+24,15       :REM*223
2496 POKE S+4,21        :REM*59
2497 FOR TT=1 TO DL:NEXT:POKE S
     +4,2Ø              :REM*42
2498 RETURN             :REM*9Ø
25ØØ REM REVERSE SELECTED ANSWE
     R                  :REM*25Ø
251Ø SYS PO,1Ø,1Ø+AN*2 :REM*146
252Ø PRINT "{CTRL Ø}{CTRL 4}";A
     N$(AN)             :REM*166
253Ø RETURN             :REM*122
26ØØ REM CORRECT ANSWER WAS GIV
     EN                 :REM*22
261Ø SS=(VA(P)*SS)*Q+SS:REM*2Ø2
262Ø SS=INT(SS)         :REM*112
2625 DL=2ØØ:GOSUB 2491  :REM*14Ø
263Ø FOR I=1 TO 11      :REM*247
264Ø SYS PO,1Ø,1Ø+AN*2  :REM*23
265Ø PRINT "{CTRL 9}{CTRL 4}";A
     N$(AN)             :REM*151
```

Now, which president was Leslie?

```
266Ø SYS PO,1Ø,1Ø+AN*2  :REM*99
267Ø PRINT "{CTRL Ø}{CTRL 2}";A
     N$(AN)             :REM*17Ø
268Ø NEXT:NC=NC+1       :REM*139
269Ø GOSUB 2ØØØ         :REM*19Ø
27ØØ RETURN             :REM*17
28ØØ REM INCORRECT ANSWER GIVEN
                        :REM*115
281Ø SS=SS-SS*VA(P)      :REM*26
282Ø SS=INT(SS)          :REM*57
2825 GOSUB 231Ø          :REM*73
283Ø FOR I=1 TO 11      :REM*184
284Ø SYS PO,1Ø,1Ø+DP*2  :REM*17
285Ø PRINT "{CTRL 9}{COMD 3}";A
     N$(DP)             :REM*69
286Ø SYS PO,1Ø,1Ø+DP*2 :REM*125
287Ø PRINT "{CTRL Ø}{COMD 3}";A
     N$(DP)             :REM*216
288Ø NEXT               :REM*2Ø1
289Ø GOSUB 2ØØØ:GOSUB 295Ø
                        :REM*126
29ØØ RETURN             :REM*233
295Ø REM SOUND DECAY    :REM*2ØØ
296Ø FOR TT=15 TO Ø STEP -1:POK
     E S+24,TT:NEXT     :REM*2Ø1
297Ø RETURN             :REM*36
3ØØØ REM GENERALIZED QUESTION R
     OUTINE             :REM*246
3Ø1Ø FOR Q=Z TO ZZ       :REM*49
3Ø11 A$="{CTRL 4}{CTRL 9}QUESTI
     ON #"+STR$(Q)+" WORTH"+STR
     $(Q)+" TIMES WAGER"
                        :REM*176
3Ø12 ZX=38-LEN(A$)-2:ZX=INT(ZX/
     2)+2               :REM*118
3Ø2Ø SYS PO,ZX,6:PRINT A$
                        :REM*253
3Ø3Ø QA=INT(RND(1)*NQ)+1
                        :REM*218
3Ø4Ø IF Q<2 THEN 3Ø9Ø    :REM*5Ø
3Ø5Ø FL=Ø:FOR K=1 TO Q:IF QF(K)
     =QA THEN FL=1      :REM*36
3Ø6Ø NEXT               :REM*122
3Ø7Ø IF FL=Ø THEN 3Ø9Ø :REM*125
3Ø8Ø GOTO 3Ø3Ø           :REM*76
3Ø9Ø QF(Q)=QA          :REM*244
31ØØ LL=LEN(NQ$(QA))     :REM*8Ø
311Ø XP=INT((38-LL)/2)+1
                        :REM*157
312Ø SYS PO,XP,8:CP=CA(QA):DP=I
     NT(RND(1)*4)       :REM*52
313Ø PRINT"{CTRL 9}{CTRL 4}";NQ
     $(QA):FK=Ø         :REM*42
314Ø FOR YP=1Ø TO 16 STEP 2
                        :REM*2Ø5
315Ø SYS PO,6,YP        :REM*56
316Ø IF FK=DP THEN A$=NA$(CP):Q
     R=FK:GOTO 324Ø     :REM*225
317Ø DA=INT(RND(1)*NA)+1:IF DA=
     CP THEN 317Ø       :REM*42
318Ø IF FK<1 THEN 322Ø :REM*186
319Ø FL=Ø:FOR K=Ø TO FK:IF DA=Q
     R(K) THEN FL=1     :REM*93
32ØØ NEXT               :REM*15
321Ø IF FL=1 THEN 317Ø :REM*244
322Ø A$=NA$(DA)         :REM*186
323Ø QR(FK)=DA          :REM*2Ø5
324Ø PRINT"{CTRL 9}{CTRL 4}";F$
     (FK);"{2 SPACEs}";A$:AN$(F
     K)=A$              :REM*34
325Ø FK=FK+1            :REM*145
326Ø NEXT               :REM*51
327Ø GOSUB 22ØØ         :REM*242
328Ø GOSUB 25ØØ:REM INDICATE AN
     SWER               :REM*177
329Ø IF AN=QR THEN GOSUB 26ØØ:G
     OTO 331Ø           :REM*66
33ØØ GOSUB 28ØØ          :REM*61
331Ø FOR TT=1 TO 4ØØØ:NEXT
                        :REM*159
332Ø SYS PA,1,6,38,11,3,Ø,Ø
                        :REM*2Ø
3325 IF SS<1 THEN Q=ZZ:GOTO 333
     Ø                  :REM*182
333Ø NEXT               :REM*137
334Ø RETURN             :REM*151
```

Listing 2. List2 program.

```
1 REM C64 HEX LOADER    :REM*224
2 OPEN 8,8,8,"PRESTRIVIA,S,W"
                        :REM*61
3 READ A$:IF A$="-1" THEN CLOSE
  8:END                 :REM*71
4 IF LEN(A$)<62 THEN 12:REM*147
5 B$=MID$(A$,1,2Ø)+MID$(A$,22,2
  Ø)+MID$(A$,43,2Ø)     :REM*133
6 FOR I=1 TO 3Ø         :REM*16Ø
7 C$=MID$(B$,(I*2)-1,2):H$=LEFT
  $(C$,1):L$=RIGHT$(C$,1)
                        :REM*2ØØ
8 H=VAL(H$):IF H$>"9" THEN H=AS
  C(H$)-55              :REM*112
9 L=VAL(L$):IF L$>"9" THEN L=AS
  C(L$)-55              :REM*151
1Ø BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*1ØØ ►
```

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```
11 NEXT:GOTO 3          :REM*1Ø7
12 IF LEN(A$)<21 THEN B$=A$:GOT
   O 15                 :REM*112
13 IF LEN(A$)<42 THEN B$=LEFT$(
   A$,2Ø)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 15           :REM*1Ø1
14 B$=LEFT$(A$,2Ø)+MID$(A$,22,2
   Ø)+RIGHT$(A$,LEN(A$)-42)
                        :REM*243
15 FOR I=1 TO LEN(B$)/2:REM*148
16 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*195
17 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55            :REM*1Ø3
18 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55            :REM*158
19 BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*93
2Ø NEXT:GOTO 3          :REM*114
21 REM 1Ø1 TRIVIA QUESTIONS
                        :REM*175
22 DATA 5Ø52455349444454E5449 41
   4CØD343ØØD47454F52 474520574
   15348494E47          :REM*166
23 DATA 544F4EØD4A4F484E2Ø41 44
   414D53ØD54484F4D41 532Ø4A454
   6464552534F          :REM*5Ø
24 DATA 4EØD4A414D45532Ø4D41 44
   49534F4EØD4A414D45 532Ø4D4F4
   E524F45ØD4A          :REM*144
25 DATA 4F484E2Ø5155494E4359 2Ø
   4144414D53ØD414E44 524557204
   A41434B534F          :REM*174
26 DATA 4EØD4D415254494E2Ø56 41
   4E2Ø425552454EØD57 494C4C494
   14D2Ø48454E          :REM*156
27 DATA 52592Ø4841525249534F 4E
   ØD4A4F484E2Ø54594C 4552ØD4A4
   14D45532Ø5Ø          :REM*177
28 DATA 4F4C4BØD5A4143484152 59
   2Ø5441594C4F52ØD4D 494C4C415
   2442Ø46494C          :REM*54
29 DATA 4C4D4F5245ØD4652414E 4B
   4C494E2Ø5Ø49455243 45ØD4A414
   D45532Ø4255          :REM*144
3Ø DATA 4348414E414EØD414252 41
   48414D2Ø4C494E434F 4C4EØD414
   E4452455720          :REM*117
31 DATA 4A4F484E534F4EØD554C 59
   535345532Ø4752414E 54ØD52555
   4484552464F          :REM*236
32 DATA 52442Ø4841594553ØD4A 41
   4D45532Ø4741524649 454C44ØD4
   34845535445          :REM*52
33 DATA 522Ø4152544855520D47 52
   4F5645522Ø434C4556 454C414E4
   4ØD42454E4A          :REM*254
34 DATA 414D494E2Ø4841525249 53
   4F4EØD47524F564552 2Ø434C455
   6454C414E44          :REM*63
35 DATA ØD57494C4C49414D2Ø4D 43
   4B494E4C4559ØD5448 454F444F5
   2452Ø524F4F          :REM*64
36 DATA 534556454C54ØD57494C 4C
   49414D2Ø54414654ØD 574F4F445
   24F572Ø5749          :REM*98
37 DATA 4C534F4EØD5741525245 4E
   2Ø48415244494E47ØD 43414C564
   94E2Ø434F4F          :REM*67
38 DATA 4C49444745ØD48455242 45
   52542Ø484F4F564552 ØD4652414
   E4B4C494E2Ø          :REM*22
39 DATA 524F4F534556454C54ØD 48
   4152525920545255 4D 414EØD445
   74947485420          :REM*183
4Ø DATA 454953454E484F574552 ØD
   4A4F484E2Ø4B454E4E 454459ØD4
   C594E444F4E          :REM*94
41 DATA 2Ø4A4F484E534F4EØD52 49
   434841524420 4E4958 4F4EØD474
   552414C442Ø          :REM*36
42 DATA 464F5244ØD4A414D4553 2Ø
   4341525445520D524F 4E414C442
   Ø5245414741          :REM*68
43 DATA 4EØD313Ø31ØD46495253 54
   2Ø53574F524E2Ø494E 2Ø4259204
   84953204641          :REM*229
44 DATA 54484552ØD333ØØD4153 53
   415353494E41544544 2Ø4259204
   C454F4E2Ø43          :REM*23
45 DATA 5A4F4C474F535AØD3235 ØD
   4841442Ø4849532Ø55 5Ø5Ø45522
   Ø4C45465420          :REM*18Ø
46 DATA 4A41572Ø52454D4F5645 44
   ØD3234ØD574153204D 415252494
   5442Ø494E2Ø          :REM*43
47 DATA 57484954452Ø484F5553 45
   ØD3232ØD4649525354 2Ø424F524
   E2Ø494E2Ø56          :REM*214
48 DATA 45524D4F4E54ØD3231ØD 46
   4952535420 4C454654 2D48414E4
   44544205052          :REM*12Ø
49 DATA 45534944454E54ØD323Ø ØD
   4649525354 2Ø544F2Ø 564953495
   42Ø57455354          :REM*246
5Ø DATA 2Ø434F415354ØD3139ØD 46
   4952535420424F524E 2Ø494E2Ø4
   F48494FØD31          :REM*33
51 DATA 38ØD464952535420424F 52
   4E2Ø494E2Ø5Ø454E4E 53594C564
   14E4941ØD31          :REM*231
52 DATA 35ØD464952535420424F 52
   4E2Ø494E2Ø31395448 2Ø43454E5
   4555259ØD31          :REM*246
53 DATA 34ØD464952535420424F 52
   4E2Ø494E2Ø4E45572Ø 48414D5Ø5
   348495245ØD          :REM*176
54 DATA 3134ØD4849532Ø565Ø2Ø 57
   41532Ø4D494C4C4152 442Ø46494
   C4C4D4F5245          :REM*88
55 DATA ØD3132ØD464952535420 42
   4F524E2Ø494E2Ø4E4F 525448204
   341524F4C49          :REM*245
56 DATA 4E41ØD3131ØD46495253 54
   2Ø544F2Ø4D41525259 2Ø4F4E2Ø4
   84953204249          :REM*225
57 DATA 525448444159ØD313ØØD 46
   4952535420424F524E 2Ø494E2Ø4
   E4557205 94F         :REM*231
58 DATA 524BØD38ØD4649525354 2Ø
   544F2Ø484156452Ø41 2Ø5354455
   Ø4D4F544845          :REM*32
59 DATA 52ØD3133ØD4649525354 2Ø
   544F2Ø555345204120 574F52442
   Ø5Ø524F4345          :REM*175
6Ø DATA 53534F52ØD3339ØD4845 2Ø
   5741532Ø424F524E2Ø 4C45534C4
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```
    Ø5241494C52          :REM*15Ø
84 DATA 4F41442Ø545241494EØD 37
    ØD4E49434B4E414D45 442Ø22544
    95Ø5Ø454341          :REM*224
85 DATA 4E4F4522ØD39ØD464952 53
    542Ø224441524B2Ø48 4F5253452
    22Ø43414E44          :REM*218
86 DATA 4944415445 2Ø454C4543 54
    4544ØD3131ØD464952 53542Ø5Ø5
    24553494445          :REM*7
87 DATA 4E542Ø544F2Ø57454152 2Ø
    412Ø4245415244ØD31 36ØD46495
    253542Ø5Ø52          :REM*77
88 DATA 45534944454E542Ø544F 2Ø
    42452Ø415353415353 494E41544
    544ØD3136ØD          :REM*239
89 DATA 4E49434B4E414D45442Ø 22
    554E434F4E44495449 4F4E414C2
    Ø5355525245          :REM*25
9Ø DATA 4E44455222ØD3138ØD4C 4F
    53542Ø5245454C4543 54494F4E2
    Ø414E442Ø4C          :REM*22
91 DATA 4154455220Ø5245454C45 43
    544544ØD3232ØD4649 525354205
    44F2Ø474554          :REM*13Ø
92 DATA 2Ø5448452Ø4E4F42454C 2Ø
    5Ø4541434520Ø5Ø5249 5A45ØD323
    6ØD46495253          :REM*182
93 DATA 542Ø544F2Ø5249444520 49
    4E2Ø414E2Ø4155544F 4D4F42494
    C45ØD3236ØD          :REM*123
94 DATA 464952535420544F2Ø52 49
    44452Ø494E2Ø414E2Ø 414952504
    C414E45ØD32          :REM*217
95 DATA 36ØD4649525354 20544F 2Ø
    4F5Ø454E2Ø5448452Ø 424153454
    2414C4C2Ø53          :REM*16Ø
96 DATA 4541534F4EØD3237ØD31 53
    542Ø42555249454420 41542Ø415
    24C494E4754          :REM*166
97 DATA 4F4E2Ø43454D45544552 59
    ØD3237ØD3153542Ø54 4F2Ø43524
    F53532Ø4154          :REM*25Ø
98 DATA 4C414E5449432Ø445552 49
    4E472Ø5445524DØD32 38ØD46495
    253542Ø544F          :REM*118
99 DATA 2Ø415Ø5Ø454152204F4E 2Ø
    54454C45564953494F 4EØD3332Ø
    D4649525354          :REM*92
1ØØ DATA 2Ø54484952442D544552 4
    D2Ø5Ø5245534944454E 54ØD333
    2ØD48452Ø5Ø52        :REM*12
1Ø1 DATA 4F5Ø4F534544204D4541 5
    44C45535320554554553 4441595
    3ØD3333ØD5448        :REM*247
1Ø2 DATA 452Ø225341474520F46 2
    Ø4D4F4E544943454C4C 4F22ØD3
    3ØD48452Ø5741        :REM*14
1Ø3 DATA 532Ø4B4E4F574E2Ø4153 2
    Ø224F4C442Ø4849434B 4F52592
    2ØD37ØD4B4E4F        :REM*162
1Ø4 DATA 574E2Ø41532Ø5448452Ø 5
    645544F2Ø5Ø52455349 44454E5
    4ØD3137ØD5448        :REM*144
1Ø5 DATA 452Ø224845524F2Ø4F46 2
    Ø415Ø5Ø4F4D4154544F 5822ØD3
    138ØD54484520        :REM*129
1Ø6 DATA 2242554C4C2Ø4D4F4F53 4
    5222Ø5Ø524553494445 4E54ØD3
    236ØD48452Ø57        :REM*65
1Ø7 DATA 41532Ø54484520F4C44 4
    553542Ø5Ø5245534944 454E54Ø
    D343ØØD48452Ø        :REM*245
1Ø8 DATA 5741532Ø544845204845 4
    1564945535420505245 5349444
    54E54ØD3237ØD        :REM*212
1Ø9 DATA 44455Ø4943544544204F 4
    E2Ø54484520464946 592Ø444
    F4C4C41522Ø42        :REM*174
11Ø DATA 494C4CØD3138ØD464952 5
    3542Ø424F592Ø53434F 55542Ø5
    44F2Ø42452Ø5Ø        :REM*1Ø6
111 DATA 5245534944454E54ØD33 3
    5ØD48452Ø4D41444520 464C4F5 ►
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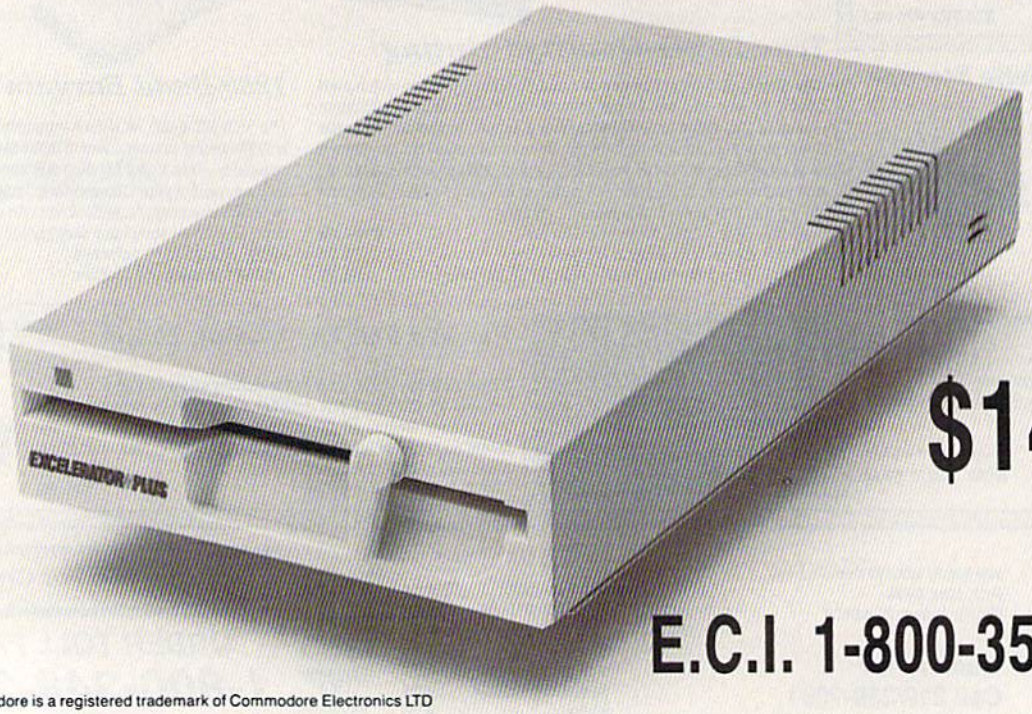

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HAIL TO THE CHIEF

```
    2494441205448          :REM*140
112 DATA 452032375448205355415
    445ØD313ØØD41445649 534F525
    3205745524520          :REM*54
113 DATA 2254484520B49544348 4
    54E2Ø434142494E4554 22ØD37Ø
    D224641544845          :REM*239
114 DATA 522Ø4F462Ø5448452Ø55 4
    E49562E2Ø4F462Ø5649 5247494
    E494122ØD33ØD          :REM*5
115 DATA 4C4541524E45442Ø544F 2
    Ø57524954452Ø574845 4E2Ø313
    72Ø5945415253          :REM*79
116 DATA 2Ø4F4C44ØD3137ØD4845 2
    Ø5741532Ø412Ø464F52 4D45522
    Ø484F4C4C5957          :REM*52
117 DATA 4F4F442Ø4143544F52ØD 3
    43ØØD48452Ø4C415445 522Ø424
    5434F4D452Ø43          :REM*83
118 DATA 484945462Ø4A55535449 4
    345ØD3237ØD41545441 434B454
    42Ø4259Ø4Ø12Ø          :REM*131
119 DATA 5357494D4D494E472Ø52 4
    142424954ØD3339ØD48 49532Ø5
    34F4E2Ø414C53          :REM*116
12Ø DATA 4F2Ø4245434 14D452Ø5Ø 5
    245534944454E54ØD32 ØD4F4E4
    C592Ø5Ø524553          :REM*141
121 DATA 4944454E542Ø454C4543 5
    445442Ø554E414E494D 4F55534
    C59ØD31ØD4849          :REM*26
122 DATA 532Ø4641544845522Ø57 4
    1532Ø414C534F2Ø5Ø52 4553494
    4454E54ØD36ØD          :REM*184
123 DATA 4849532Ø455354415445 2
    Ø5741532Ø4B4E4F574E 2Ø41532
    Ø224845524D49          :REM*117
124 DATA 5441474522ØD37ØD4B4E 4
    F574E2Ø41532Ø544845 2Ø224C4
    954544C452Ø4D          :REM*124
125 DATA 4147494349414E22ØD38 Ø
    D48452Ø534552564544 2Ø464F5
    22Ø4F4E4C592Ø          :REM*252
126 DATA 33312Ø44415953ØD39ØD 4
    B4E4F574E2Ø41532Ø22 4849532
    Ø4143434944 5          :REM*193
127 DATA 4E435922ØD313ØØD5445 5
    24D2Ø4D415252454 2Ø 42592Ø2
    2544541 5Ø4F54         :REM*41
128 DATA 2Ø444F4D452Ø5343414E 4
    4414C22ØD3239ØD4952 414E2D4
    34F4E54524 12Ø         :REM*254
129 DATA 5343414E44454C2Ø5Ø4C 4
    14755454420484 94DØD 343ØØD4
    F4E4C592Ø4F4E          :REM*239
13Ø DATA 452Ø544F2Ø4245204157 4
    1524445442Ø412Ø5Ø41 54454E5
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131 DATA 535545442Ø5448452Ø45 4
    D414E43495Ø4154494F 4E2Ø5Ø5
    24F434C414D41          :REM*141
132 DATA 54494F4EØD3136ØD4752 4
    14E4446415448455220 5345525
    645442Ø41532Ø          :REM*81
133 DATA 3954482Ø5Ø5245534944 4
    54E54ØD3233ØD4B494C 4C45442
    Ø42592Ø414E2Ø          :REM*1
134 DATA 414E4152434849535420 4
    94E2Ø42554646414C4F ØD3235Ø
    D48452Ø574F4E          :REM*24
135 DATA 2Ø4E4F42454C2Ø5Ø4541 4
    3452Ø5Ø52495A452Ø49 4E2Ø313
    93139ØD3238ØD          :REM*2Ø
136 DATA 48452Ø53555256495645 4
    42Ø415454414 34B2Ø42 592Ø535
    15545414B592Ø          :REM*1Ø3
137 DATA 46524F4D4D45ØD3338ØD 4
    8452Ø53414944 2Ø2254 48452Ø4
    255434B2Ø5354          :REM*82
138 DATA 4F5Ø532Ø48455245220ØD 3
    333ØD415554484F5249 5A45442
    Ø46495253542Ø          :REM*112
139 DATA 555345204F462Ø544845 2
    Ø412D424F4D42ØD3333 ØD48452
    Ø435245415445          :REM*56
14Ø DATA 442Ø4E41544FØD3333ØD 4
    8452Ø53544152544544 2Ø54484
    52Ø4D41525348          :REM*37
141 DATA 414C4C2Ø5Ø4C414EØD33 3
    3ØD48452Ø52454C4945 5645442
    Ø47454E455241          :REM*121
142 DATA 4C2Ø4D41434152544855 5
    2ØD3333ØD5741544552 4741544
    52Ø4C45442Ø54          :REM*211
143 DATA 4F2Ø4849532Ø444F574E 4
    6414C4CØD3337ØD4F52 4445524
    5442Ø22424159          :REM*218
144 DATA 2Ø4F462Ø5Ø4947532220 4
    4495341535445520D33 35ØD424
    F59434F545445          :REM*167
145 DATA 442Ø54484520 4D4F5343 4
    F572Ø4F4C594D5Ø4943 2Ø47414
    D4553ØD3339ØD          :REM*243
146 DATA 4845204953204255524 9 4
    5442Ø494E2Ø4752414E 5427532
    Ø544F4D42ØD31          :REM*1Ø3
147 DATA 38ØD48452Ø4C45442Ø54 4
    8452Ø4E4F524D414E44 592Ø494
    E564153494F4E          :REM*165
148 DATA ØD3334ØD415554484F52 4
    5442Ø424F4F4B2Ø2243 5255534
    144452Ø494E2Ø          :REM*181
149 DATA 4555524F5Ø4522ØD3334 Ø
    D5448452Ø53544F434B 2Ø4D415
    24B4554204352          :REM*176
15Ø DATA 4153484544 2Ø494E2Ø48 4
    9532Ø5445524DØD3331 ØD48452
    Ø524543454956          :REM*58
151 DATA 45442Ø412Ø5Ø52455349 4
    4454E5449414C2Ø5Ø41 52444F4
    EØD3337ØD4445          :REM*119
152 DATA 4D414E4445442Ø555353 5
    22Ø52454D4F56452Ø4D 4953534
    C45532Ø494E2Ø          :REM*254
153 DATA 43554241ØD3335ØD4845 2
    Ø414456414E4345442Ø 55532Ø5
    35Ø4143452Ø5Ø          :REM*173
154 DATA 524F4752414DØD3335ØD 4
    8452Ø56495349544544 2Ø22544
    8452Ø4556494C          :REM*183
155 DATA 2Ø454D5Ø49524522ØD34 3
    ØØD46494C4D45442Ø22 4245445
    4494D4520464F          :REM*159
156 DATA 522Ø424F4E5A4F22ØD34 3
    ØØD                    :REM*118
157 DATA -1                :REM*15
```

■

TYPE-IN TROUBLES?

YOU HAVE TYPED IN A *RUN* PROGRAM and are having some problems getting it to run. After a while, you feel like calling for help, but since we're not next door, it's expensive to call us. But we can share our experiences with you. Having heard from many users over the years about their difficulties with typing in listings, we've identified a few recurring problems that plague many people but are easy to fix. So read on and see if your problem is one of these. If so, perhaps the answers will help you find and correct the difficulty.

- You get an Out of Data in Line xxx message. This means that a program line was reading from Data statements and reached the end of the data before it was done reading. There are two possible problems.

One might be with the line that reads the data, usually a For... Next loop. Make sure you have the proper values for the loop, because if the listing has a loop of 0 to 150 and you've typed 0 to 160, you'll get the "Out of Data" message. If the loop is correct, then the problem lies in the Data statements themselves. One possibility is that you omitted a whole line of data. That's easy enough to find and correct. More likely, you may have skipped one or more individual data items or typed in a period instead of a comma, which causes two data values to be read as one number. Check your typing carefully against the listing.

- You get an Illegal Quantity Error in Line xxx. That means that you've read a number from a Data statement and tried to Poke it into a memory address. The error occurs because the number is larger than 255 (the largest value a memory address can contain), which means that somewhere in your Data statements you've made an error by typing in a number larger than 255. Again, this is easy to check for and correct. Just look in your Data statements for a number larger than 255. You might have added an extra digit, or perhaps you ran two numbers together (23456 instead of 234,56).
- You get a Syntax Error in Line xxx. This could be almost anything. What it tells you is that there is something wrong in the indicated line. Usually you've misspelled a Basic keyword or omitted some required character. List the line and examine it carefully.
- You get an Error in Data message. This occurs in programs that add up all the data as read, and, when finished, compares that sum with what it should be if all the data were typed in correctly. If it isn't the same, it means an error somewhere in typing the Data statements. Go back and check the data carefully, correct the mistake(s), save the new version and try again.

Finally, we urge everyone who intends to type in one of our listings to use *RUN*'s Checksum program, which is printed in each issue. This nifty little program will help you avoid every mistake we mentioned above, except that it won't detect the omission of a line. ■

—LOU WALLACE

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COMMODORE CLINIC

Load Advanced Art Studio pictures on your 128; learn some Basic disk commands.

By LOU WALLACE

UPDATE

Q *In the May 1988 issue of* RUN, *on page 47, you touted the C-128 Developer's Package in a sidebar ("And the Latest...") to the article ("The Assembly Line") on assemblers. I haven't been able to locate a source for the reference system.*

—DAN W. CROCKETT
PINETOP, AZ

A You can get the Developer's Package by sending a check or money order for $50 to Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380, Attn.: CATS Orders.

SOFTWARE

Q *The Advanced OCP Art Studio saves the multicolor picture I created into one large 40-block file. How can I separate it into components that I can load directly in C-128 mode, and how can I load it once it's separated?*

—STEVE DELASSUA
FLORISSANT, MD

A The best method is to break down the multicolor picture file into four parts: a bitmap (8K), two color memories (1K each) and the background and border colors (two bytes). These can then be individually loaded into the areas of the C-128's memory that are necessary to display the picture. For this, I wrote two simple Basic 7.0 programs. The first (Listing1) converts multicolor Advanced OCP Art Studio pictures into the four files. It prompts you for the name, then writes them out with the suffixes BM (bitmap), C1 (color memory 1), C2 (color memory 2) and C3 (background and border color).

The second listing, using Basic 7.0, loads and displays the picture, using the four files made with Listing 1. It can easily be used as a subroutine in your programs to display your pictures.

```
0 REM LISTING 1—CONVERT
10 PRINT "THIS CONVERTS ADVANCED
   ART STUDIO"
20 PRINT "MULTICOLOR MODE
   PICTURES TO FOUR FILES"
30 PRINT "THAT CAN BE LOADED FROM
   BASIC 7.0"
40 PRINT
50 PRINT "NAME (MPIC SUFFIX IS NOT
   NEEDED)"
60 INPUT F$
70 N$ = F$ + "{16 spaces}"
80 N$ = LEFT$(N$,12):N$ = N$ + "MPIC"
90 BANK 0
100 BLOAD (N$),B0,P8192
110 BSAVE (F$ + ".BM"),B0,U8,P8192 TO
    P16192
120 BSAVE (F$ + ".C1"),B0,U8,P16192 TO
    P17192
130 BSAVE (F$ + ".C2"),B0,U8,P17208 TO
    P18208
140 BSAVE (F$ + ".C3"),B0,U8,P18208 TO
    P18210
150 BANK 15
```

```
0 REM LISTING 2 — DISPLAY
10 INPUT "PICTURE NAME";F$
20 GRAPHIC 3,1
30 POKE 1,PEEK(1) AND 254
40 BLOAD (F$ + ".BM"),B0,P8192
50 BLOAD (F$ + ".C1"),B0,P7168
60 BLOAD (F$ + ".C2"),B15,P55296
70 BLOAD (F$ + ".C3"),B13,P53280
80 GETKEY A$
90 GRAPHIC0
```

PROGRAMMING

Q *Could you give me a short and simple example for performing basic disk commands? I'm a new owner, and the 1541 and 1571 manuals are quite confusing. I have to dig hard to find what I need!*

—JERRY GOLDSTEIN
NEW YORK, NY

A You're right about the manuals being confusing to the new owner. But, in general, it's a good idea for the beginner to study the manuals that come with the computer; they'll begin to make a lot more sense after a while.

In the following examples, the C-64 Basic 2.0 version is given first, followed by the C-128's Basic 7.0 syntax. I used the generic FILENAME or DISKNAME in all cases. Replace them with your own file or disk name when you're using the examples. All commands assume you're using drive 8, but you could change them to work on other drives if that is necessary.

To read a directory:

```
C-64:     LOAD "$",8
C-128:    DIRECTORY
```

To load a program:

```
C-64:     LOAD "FILENAME",8
C-128:    DLOAD "FILENAME"
```

To save a program:

```
C-64:     SAVE "FILENAME",8
C-128:    DSAVE "FILENAME"
```

To verify a program in memory with one on disk:

```
C-64:     VERIFY"FILENAME",8
C-128:    DVERIFY"FILENAME"
```

To format a disk:

```
C-64:     OPEN 15,8,15,"N0:DISKNAME,
  XX":CLOSE 15
C-128:    HEADER "DISKNAME",IXX
```

(Note: XX is any two numbers or characters to be used as a unique ID number.)

To erase a file:

```
C-64:     OPEN 15,8,15,"S0:FILENAME":
  CLOSE 15
C-128:    SCRATCH "FILENAME"
```

To rename a file:

```
C-64:     OPEN 15,8,15,"R0:NEWFILE
  NAME = 0:OLDFILENAME":CLOSE 15
C-128:    RENAME "OLDFILENAME" TO
  "NEWFILENAME"
```

To initialize a drive:

```
C-64:     OPEN 15,8,15,"I0":CLOSE 15
C-128:    DCLEAR
```

To validate a disk:

```
C-64:     OPEN 15,8,15,"V0":CLOSE 15
C-128:    COLLECT
```

To switch a 1571 to 1541 mode:

```
C-64 and C-128:    OPEN 15,8,15,"U0>
  M0":CLOSE 15 ■
```

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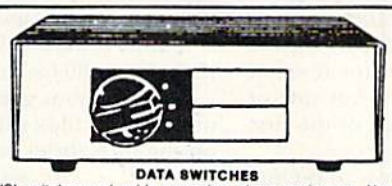

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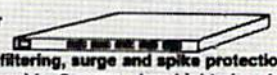

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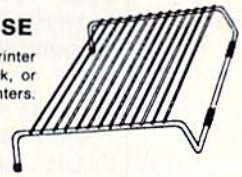

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MEGA-MAGIC

Now, instead of using the Scratch command, you can delete any number of files with the press of a key.

MASS FILE DELETER

Okay, this time I mean it! I will sit down and *clean up some of my disks*. Several of them are filled with unneeded, unwanted, or just plain unknown files. A couple have several versions of programs I've been working on. But using the Scratch command, OPEN15,8,15,"S0:Filename", could take forever.

Here comes Mass File Deleter, a program that reads the contents of a disk directory, assigns filenames to a string array, then displays those names on-screen, allowing you to select which files need to vanish with the press of a key. When you're finished picking out files to delete, another keystroke will automatically scratch all of those files for you. What a relief!

First, type in the program, using *RUN*'s Checksum program to ensure accuracy, and save at least one copy to disk; then run the program. You'll be prompted to insert a disk to read. Press any key after the disk is in the drive, and the program will read into memory all undeleted directory files.

When the screen clears, an option menu appears on the right side of the screen. The first 12 filenames (or fewer if there are fewer files on the disk) appear on the left side of the screen, and a small arrow appears to the left of the first filename.

Use the cursor up-down key to move the arrow to the file you wish to scratch, and press the S key. (Note that the program is not deleted at this time.) Repeat this procedure for however many files you want to delete. If your disk contains more than 12 files, press the N key to display the next 12 files, or the L key to display the last page. The N key is disabled on the last page of filenames, and you can't page forward past the first 12 names with the L key.

When you've finished selecting the files to delete, press the E key to execute. The program will display the names of all the files you selected to delete, and asks if it is okay to scratch these files. If you're sure, press Y. The files will automatically be deleted, and the program will end, displaying the number of files deleted. If you're not sure, press N, and the program terminates with no action taken. Also, pressing Q from the menu will end the program.

This program runs on a 64 and on the 128 in either 40- or 80-Column mode. The program checks for which machine it is running on, and, if in 128 mode, whether in 40 or 80 columns. It adjusts itself accordingly, going into Fast mode if you're in 80-Column mode.

This program greatly eases the pain of purging disks of unnecessary files, with the side effect of making what remains on the directories easier to read.

—KENNY LAWSON, INDIANAPOLIS, IN Ⓡ

Listing 1. Mass File Deleter program.

```
10 REM MASS FILE DELETER - KENNY LAWSON
                                        :REM*120
20 DIMFI$(144),DL$(144),DL(144):PRINTCHR$(
   19)CHR$(19)                          :REM*71
30 PRINTCHR$(147)CHR$(17)"INSERT DISK TO R
   EAD AND PRESS ANY KEY"               :REM*77
40 GETA$:IFA$=""THEN40                  :REM*224
50 POKE53280,0:POKE53281,0:PRINTCHR$(30)CH
   R$(147)                              :REM*202
60 PRINT"READING DIRECTORY....":GOSUB490:T
   B=0:CL=214:IFPEEK(65534)=72THEN80
                                        :REM*98
70 CL=235:IFPEEK(215)>127THENTB=20:SYS3064
   3                                    :REM*122
80 NP=NF/12:IFNP<>INT(NP)THENNP=INT(NP+1)
                                        :REM*28
90 FORX=1TO22+TB:TB$=TB$+CHR$(32):NEXT
                                        :REM*45
100 PRINTTB$"{5 SPACEs}OPTIONS":PRINT:PRIN
    TTB$"TOTAL FILES ON"                :REM*135
110 PRINTTB$"THIS DISK ="NF:PRINT:PRINTTB$
    "NUMBER":PRINTTB$"OF PAGES ="NP:PRINT
                                        :REM*107
120 PRINT:PRINTTB$"'N' FOR NEXT PAGE":PRIN
    T:PRINTTB$"'L' FOR LAST PAGE" :REM*108
130 PRINT:PRINTTB$"'S' TO SCRATCH":PRINT:P
    RINTTB$"'E' TO EXECUTE":PRINT  :REM*21
140 PRINTTB$"'Q' TO QUIT":PRINT:PRINT:PRIN
    TTB$"{2 SPACEs}SELECT OPTION" :REM*243
150 PN=0:PRINTCHR$(5):GOSUB360     :REM*137
160 GETA$:IFA$=""THEN160           :REM*34
170 IFA$=CHR$(17)ANDPEEK(CL)<22THENGOSUB31
    0:GOTO160                      :REM*163
180 IFA$=CHR$(17)ANDPEEK(CL)=22THENGOSUB34
    0:GOTO160                      :REM*223
190 IFA$=CHR$(145)ANDPEEK(CL)=0THENGOSUB35
    0:GOTO160                      :REM*123
200 IFA$=CHR$(145)ANDPEEK(CL)>1THENGOSUB32
    0:GOTO160                      :REM*66
210 IFA$="Q"THENPRINTCHR$(147)"PROGRAM TER
    MINATED. NO FILES SCRATCHED.":END
                                   :REM*138
220 IFA$="S"THENDL=1+(PEEK(CL)/2)+(PN*12):
    GOSUB290:GOTO160               :REM*60
230 IFA$="E"ANDFSTHENX=1:GOTO390   :REM*56
240 IFA$="L"ANDPN=0THEN160         :REM*49
250 IFA$="L"THENPN=PN-1:GOSUB360:GOTO160
                                   :REM*46
260 IFA$="N"ANDPN=NP-1THEN160      :REM*237
270 IFA$="N"THENPN=PN+1:GOSUB360   :REM*236
280 GOTO160                        :REM*102
290 IFDL(DL)<>0ORLEN(FI$(DL))>16THENRETURN ►
```

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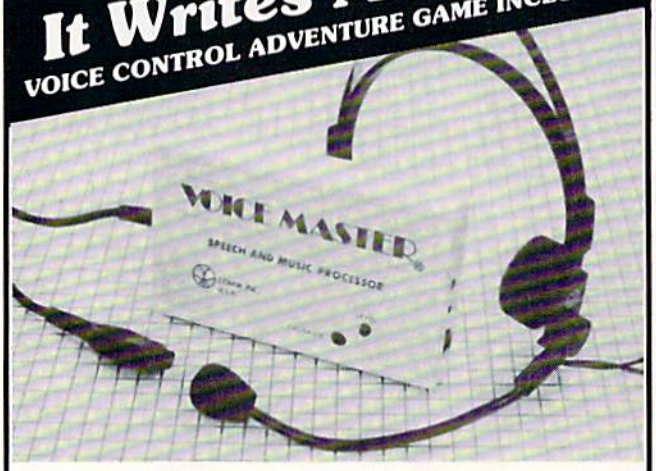

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MEGA-MAGIC

```
                                        :REM*18Ø
3ØØ FS=FS+1:DL(DL)=1:DL$(FS)=FI$(DL):RETUR
    N                                   :REM*116
31Ø PRINTCHR$(157)CHR$(32):PRINT:PRINTSPC(
    TB)CHR$(62);:RETURN                 :REM*12Ø
32Ø PRINTCHR$(157)CHR$(32):PRINTCHR$(145)C
    HR$(145)CHR$(145);                  :REM*72
33Ø PRINTSPC(TB)CHR$(62);:RETURN        :REM*88
34Ø PRINTCHR$(157)CHR$(32)CHR$(19)SPC(TB)C
    HR$(62);:RETURN                     :REM*171
35Ø PRINTCHR$(157)CHR$(32):POKECL,21:PRINT
    :PRINTSPC(TB)CHR$(62);:RETURN       :REM*49
36Ø PRINTCHR$(19);:FORX=1TO24:PRINTTB$:NEX
    T:PRINTCHR$(19);                    :REM*61
37Ø FORG=PN*12+1TOG+11:PRINTTAB(TB+2)FI$(G
    ):PRINT:NEXT                        :REM*34
38Ø PRINTCHR$(19)SPC(TB)CHR$(62);:RETURN
                                        :REM*233
39Ø PRINTCHR$(147);:FORT=XTOX+21:PRINTDL$(
    T):NEXT:IFT>FSTHEN43Ø               :REM*229
4ØØ PRINT:PRINTSPC(4+TB)"PRESS SPACE BAR F
    OR MORE FILES"                      :REM*2Ø6
41Ø GETA$:IFA$=CHR$(32)THENX=X+22:GOTO39Ø
                                        :REM*112
42Ø GOTO41Ø                             :REM*235
43Ø PRINT:PRINTSPC(2+TB)"OKAY TO SCRATCH T
    HESE FILES?{3 SPACEs}(Y/N)"         :REM*126
44Ø GETA$:IFA$="N"THENA$="Q":GOTO21Ø
                                        :REM*235
45Ø IFA$<>"Y"THEN44Ø                    :REM*48
46Ø OPEN15,8,15:FORX=1TOFS:PRINTCHR$(147)"
    DELETING "DL$(X)                    :REM*135
47Ø PRINT#15,"SØ:"+DL$(X):NEXT:CLOSE15
                                        :REM*2
48Ø PRINTCHR$(147)"PROGRAM TERMINATED."FS"
    FILES SCRATCHED.":END               :REM*89
49Ø CLOSE15:OPEN15,8,15:CLOSE8:OPEN8,8,8,"
    #":TR=18:SE=1:FL=Ø                  :REM*253
5ØØ GOSUB62Ø:FORCT=1TO8:F$="":FORX=1TO3Ø:G
    ET#8,D$:F$=F$+LEFT$(D$+CHR$(Ø),1)
                                        :REM*1Ø8
51Ø NEXTX:IFCT<>8THENGET#8,A$,B$        :REM*1Ø8
52Ø NF=NF+1:FI$(NF)=F$:NEXTCT:IFSE<>255THE
    N5ØØ                                :REM*112
53Ø CLOSE8:CLOSE15:NF=NF-1:FORX=1TONF:F=Ø:
    A=Ø:FORY=5TO19                      :REM*217
54Ø IFASC(LEFT$(FI$(X),1))<129THENDL(X)=1:
    Y=19:GOTO57Ø                        :REM*87
55Ø IFMID$(FI$(X),Y,1)=CHR$(16Ø)THENA=Y-4:
    F=1:Y=19:GOTO57Ø                    :REM*1Ø5
56Ø IFF=ØANDY=19THENA=16                :REM*52
57Ø NEXTY:FI$(X)=MID$(FI$(X),4,A):NEXTX
                                        :REM*15
58Ø FORX=1TONF:IFLEN(FI$(X))THEN6ØØ:REM*19
59Ø F=1:FORY=XTONF:FI$(Y)=FI$(Y+1):NEXT:NF
    =NF-1                               :REM*58
6ØØ NEXTX:IFFTHENF=Ø:GOTO58Ø            :REM*213
61Ø RETURN                              :REM*242
62Ø PRINT#15,"U1:"8;Ø;TR;SE:GET#8,A$,B$:SE
    =ASC(B$+CHR$(Ø)):RETURN             :REM*169
```

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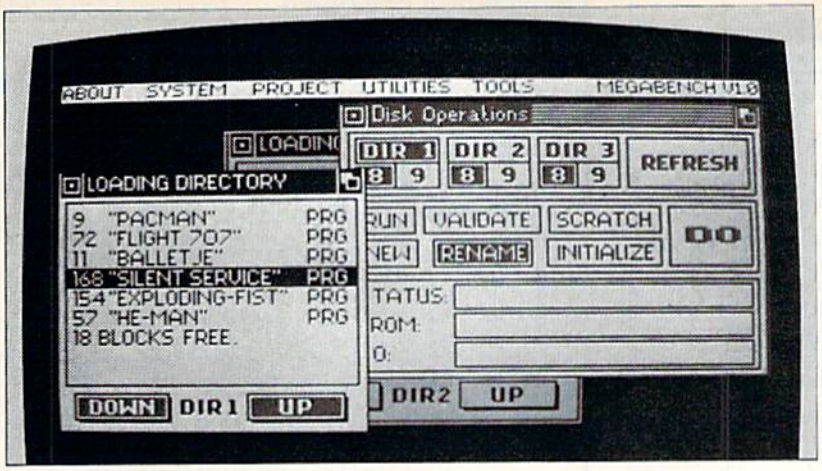

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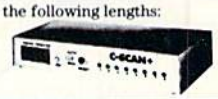

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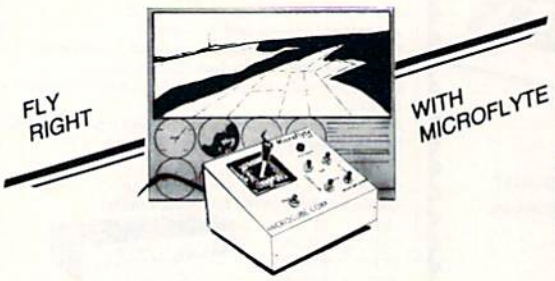

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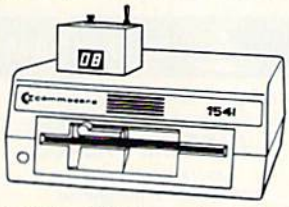

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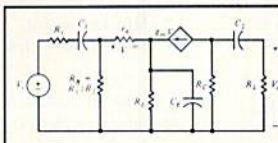

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FINANCE PROGRAM—
Need help in managing your finances? The December issue will include an easy-to-use C-128 program to assist you in keeping track of your earnings and expenditures.

HOLIDAY TREATS—
As special holiday offerings, we have also planned an exciting arcade game, a type-in program for GEOS users, the results of Berkeley Softworks' deskTop Publishing Contest, as well as reviews, tutorials, programming tips, news and applications for C-64 and C-128 owners.

SOFTWARE SUPPORT—
Also, to find out what commercial software will take maximum advantage of Commodore's RAM expansion units, 1581 disk drive or 1351 mouse, C-64 and C-128 owners will want to tune in to next month's issue, when we reveal all.

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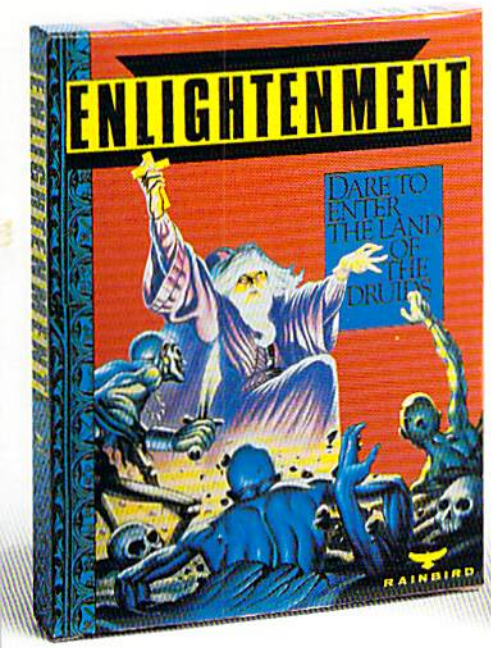

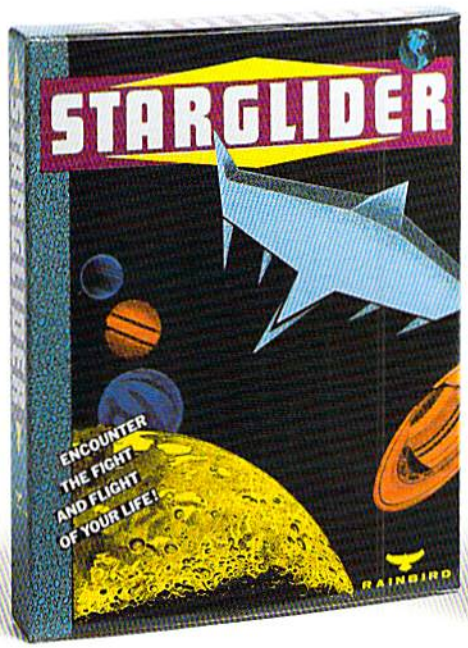

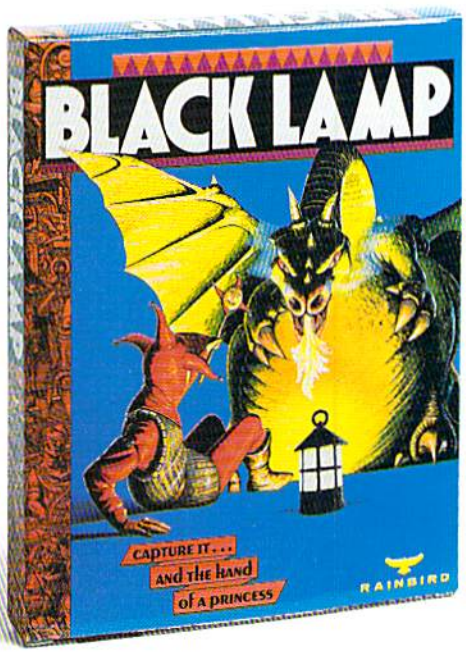

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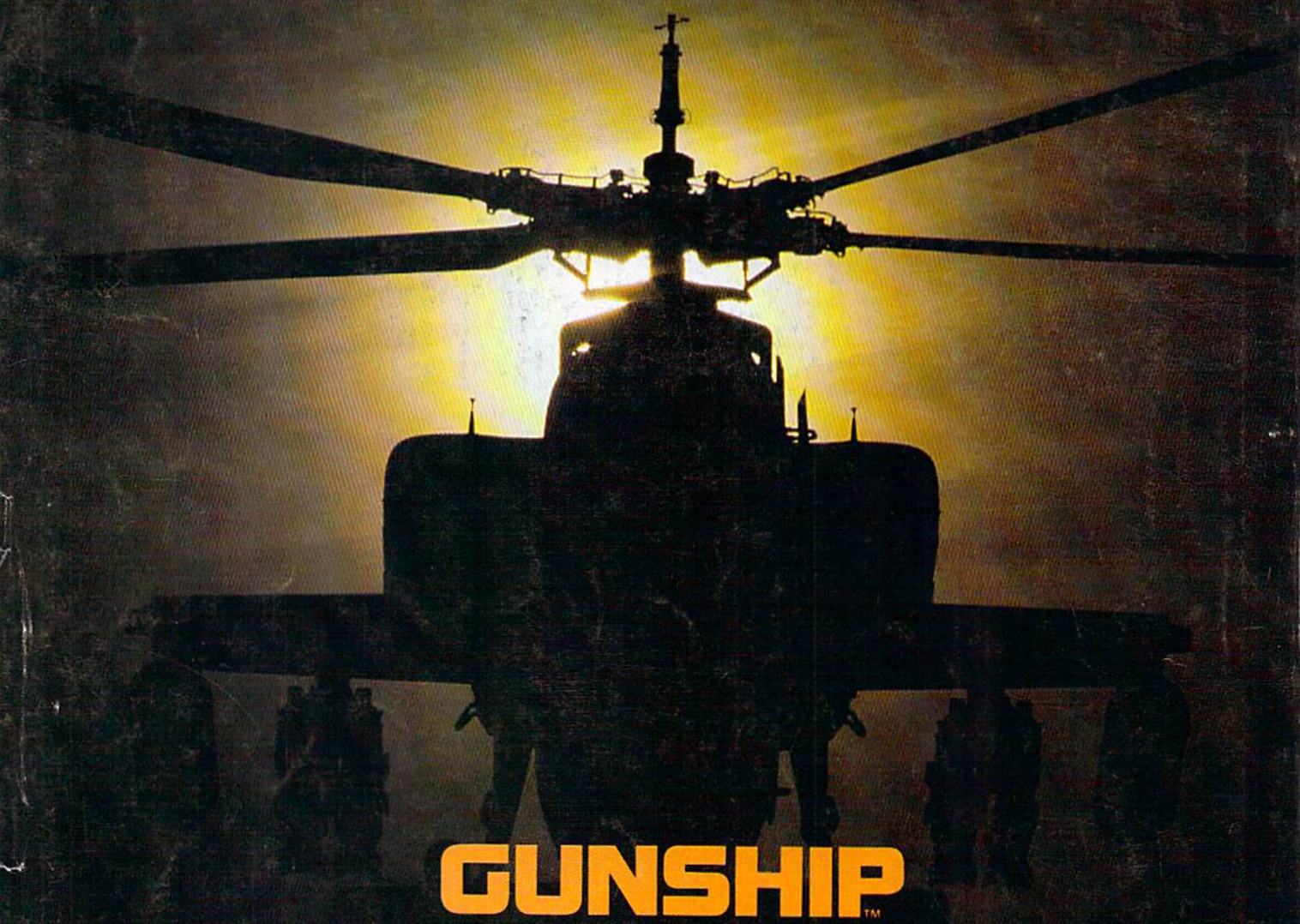

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